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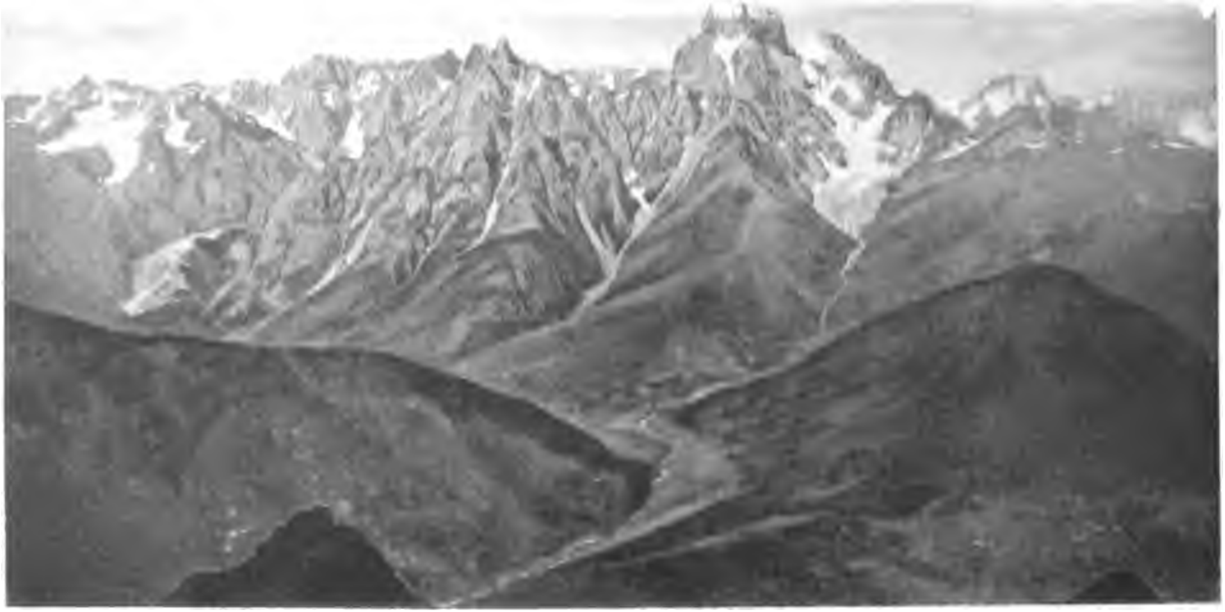

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USHBA.

From Photograph by Vittorio Sella, 1889.

APPALACHIA.

VOL. VI. BOSTON, MAY, 1890. No. 1.

Ushba.

IF the Publishing Committee need to offer excuses for presenting as a frontispiece for the sixth volume of APPALACHIA the picture of a mountain of which perhaps few have even heard the name, without the usual accompaniment of a descriptive article from one who has visited it, surely the grandeur and wild beauty of this superb likeness of Ushba will plead powerfully in their behalf. It might, however, also be urged that it was time for our Club to recognize in this semi-official way a fact of some importance in the history of man's relation to the mountain; namely, that the centre of interest for climbers of the first order — those who seek the presence of these giants for the purpose of surmounting almost insuperable difficulties, while at the same time solving some of the most fascinating problems of the unknown — has been transferred from the Alps to a grander Switzerland, lying between the Black Sea and the Caspian, where Europe and Asia clash upon each other in the mighty crest of the main Caucasian chain.

As in the case of the Alps, so also here it is Englishmen who have led the way. What Pococke and Windham accomplished in 1741 by their visit to the then wild and ill-reputed valley of Chamonix, that Messrs. Freshfield, Moore, and Tucker, with their Swiss guide Dévouassoud, have done for the Caucasus by their visit to "savage Suanetia" in 1868.

They will be looked to as pioneers by these coming generations of tourists that a seemingly inevitable repetition of history will bring to these regions, to enjoy in comfort what they yet more richly enjoyed as first discoverers,—for true appreciation is discovery,—when the way was beset with the difficulties incident to travel in a poorly mapped country where enormous natural barriers offer obstacles almost unparalleled, and where life also was in no small degree imperilled by the character of the semi-barbarous population.

That was hardly more than twenty years ago; yet although the number of Europeans who have visited the Caucasus is still very small, much has been done in the way of high ascents, much too for the increase of geographical knowledge. It was not until forty-five years after that first visit to Chamonix that Balmat made the first ascent of Mont Blanc, followed a year later by a second in company with De Saussure the scientist. Matters move faster and along bolder lines in our time. The intervening century has developed the sentiment of Nature in this larger aspect, and with it the arts of mountain-craft and ice-craft. The pioneers to the Caucasus, going for the very purpose, ascended two peaks that out-tower the long unrivalled "monarch of mountains,"[1]—Elbruz (18,526 feet) and Kasbek (16,546 feet),—both doubtless first ascents, unless we also make the one exception of a witty ex-president of the Alpine Club, "Kasbek possibly by Prometheus;" they corrected the mistaken notions of geographers regarding the topography of the regions visited, and especially as to the alleged absence of great glaciers. Returned to England, they celebrated the glories of the greater Switzerland; but even in the Alpine Club their stories stimulated only an occasional follower so long as there remained virgin peaks of the Alps or of Haut Dauphiné to inspire the new generation of aspirants for the mantles of Whymper, Ball, and Tyndall. The last years of the second decade since that pioneer visit witnessed an awakening, and since 1886 the quarterly issues of the "Alpine Journal," to say nothing of the "Proceedings of the Royal Geographical Society," have teemed with articles on the Caucasus, while the years 1888 and 1889 witnessed the return of the golden age in alpinism. The remaining highest and apparently inaccessible peaks have been climbed and measured,[1] the enormous glaciers have been yet farther investigated, and — best of all for such of us as must defer at least our visit to these scenes — several series of photographs of unrivalled grandeur have been secured, which suggest with a power of realism beyond all other expression the wonders of the region. To Donkin, the lamented Englishman who lies buried with his adventurous companions in unknown depths of the glaciers of Dych-tau, to Déchy the Hungarian, to Sella the Italian, and still others, all who can appreciate Nature on a grand scale owe a lasting debt of gratitude. We in particular are under a special obligation to Signor Vittorio Sella, by whose courtesy we are allowed to reproduce this artistically beautiful as well as grandly impressive subject, — Ushba from the western crest of Leila Gora.[2]

---

[1] The height of Mont Blanc is 15,780 feet.

Suanetia is to the central Caucasus, on a grander scale, what the Visp Valley is to the Alps, — a favored centre of grand mountain scenery, with the added beauty of a forest growth of almost tropical luxuriance climbing to the eternal snows, while in the lowlands wave fields of golden grain; and sprinkled along the cleared hill-slopes near the streams are the white-towered villages of the formerly bloodthirsty and vindictive Suanetians, — the Corsicans of the Orient. It lies south of the great central chain, wholly hemmed in by high mountains, over which in order to reach it one must cross by some pass, as no other practicable entrance as yet exists. It comprises an irregular basin about forty by fifteen miles in extent, being the upper valley of the river Ingur, which bears hence to the Black Sea the melted snows of most of the great glaciers on the southern slopes of the great divide, as well as of those lesser ones which lie in the gorges of the Leila, the range which bounds Suanetia on the south. Out of this secluded valley the Ingur flows by a practically impassable cañon. Above the head-waters of the Ingur and its first torrential tributaries tower the massive glacier-robed mountains, Tetnuld, Kartan-tau, Djanga, Shkara (second only to the peaks of Elbruz in height), and Naumquam,—a giant company that greet the traveller just across the narrowed Suanetian vale as he passes by the col of the Latpari Pass (9,273 feet) over the crest of the Leila Mountains. Farther westward along the great jagged wall of ice and granite which divides Asia from Europe, the eye ranges till it rests on Ushba, towering 11,500 feet above its base at Betsho. If we may judge by the unanimous testimony of all who have put in print their sentiments of wonder and admiration at the first sight of this peak, and by the epithets which characterize nearly every later mention of its name,—and this too from men not prone to gush, and who are familiar with the grandeurs of the Alps,—it is safe to infer that for mountain architecture Ushba is unrivalled among the known mountains of the globe.

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[1] The following is a tolerably complete list of first ascents, the year when made, and by whom, (C. = Cockin; Dn. = Donkin; Dt. = Dent; Dy. = Déchy; F. = Freshfield; H. = Holder; S. = Sella; W. = Woolley; Tau = mountain range, Tartar): In 1884, Adai Choch (15,241 feet), Dy. In 1886, Gestola (16,500 feet), Dt., Dn. In 1887, Tetnuld (16,700 feet), F.; Uku (?), F. In 1888 Shkara (17,270 feet), C.; Koshtan-tau (17,096 feet), M.; Djanga (16,700 feet), C; Kartan-tau (16,500 feet), H. & W.; Ushba, North (15,700 feet), C.; Salananchera (15,500 feet), C. & H.; Dongosorun (14,592 feet), Dn. & Fox. In 1889, Dych-tau (16,925 feet), W.; Mishirgi-tau, East peak (16,135 feet), W.; Koroldu (15,000 feet), W.; Mala-tau (15,351 feet), S.; Leila, Central Peak (13,500 feet), S.; Northwest Peak (13,300 feet), F.

[2] The view was taken near sunset at an elevation of about 11,800 feet above the sea, and 7,500 above the valley.

In illustration let us first quote from A. Ilyin's article under the simple title "Uzhba," in the "Proceedings of the Imperial Russian Geographical Society for 1883,"—the most extended article, so far as we are aware, dedicated to this single mountain.[1] He says:—

> "In every narrative of travel in Suanetia or the upper Baksan we find mention of the remarkable mountain which Colonel Bartholomei, the first traveller in this country,—its Amerigo Vespucci,—took for Elbruz, and which Abich the academician, so reserved in his descriptions and praises of Nature, has called the most picturesque and wondrous of the mountains of Suanetia. This peak is not Elbruz, as Bartholomei supposed, but a new giant Uzhba. . . . Like Bartholomei, we first saw Uzhba from the Latpari Pass. . . . Suddenly falling away to the left of Tetnuld, a long ridge reaches out to the westward,—the middle range of

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[1] See also Petermann's Mittheilungen, vol. xxx.

Suanetia. Behind it, abutting upon the rear of Tetnuld and gradually receding to the horizon, extends the somewhat curving wall of the principal range. All this distance it is evidently lower than near Tetnuld; here and there its slopes are patched with white, but on its most distant *massifs* we find once more vast fields of snow, their dazzling reflections tinged with blue. Far away on this crest, at nearly double the distance that separates Latpari and Tetnuld, towers an isolated peak, singularly beautiful in its outlines. Its shape vaguely suggests a half-ruined Gothic cathedral set upon an enormous crag. The two towers with their tapering spires are gone; only their bases are left. Snow gleams on these, and on the cornices that still remain intact. What has fallen lies, a mighty wreck, at the base of the vertical walls beneath a shroud of snow. Such is Uzhba."

Not unlike this, though he saw the peak from a different point of view, is Mr. Freshfield's description[1] in the story of his first visit to Suanetia: —

"The path winds along the slopes, through young woods of beech, oak, hazel, and aspen, until the summit of the spur separating Latal and Betscho is attained. Just before reaching it we sat down to admire the summit of Tau Tötönal,[2] and the southern face of the mountains above Jibiani, which had come into sight over the lower ranges. Nearer, and scarcely less beautiful, the range of the Leila formed a second picture, which elsewhere would have riveted the attention. A shout from Moore, however, hurried me on to where he was sitting with François, one hundred yards in advance, apparently gazing, in a state of astonishment that for the moment rendered them unable to express their feelings, at some castle in the air.

"On reaching my companions, I was at no loss to discover the cause of their emotion. Due north, above the low wood of the adjoining hillside, shot up two towers of rock, one slightly in advance of the other, forming, as regards height, steepness, and outline, beyond all comparison the most wonderful mountain mass we had ever beheld. Tier above tier of precipices rose straight up from the valley, culminating in two tremendous towers, separated by a deep depression. The two summits resembled one another in form, and appeared to be long roof-like ridges, falling away in slopes of mingled rock and ice of terrific steepness. The idea of climbing either of them seemed too insane to be so much as suggested; and even the lower spurs of the mountain above the meadows of Betscho are so tremendous that it looked as if a stone dropped from the top of either of the peaks would scarcely stop rolling before it reached the valley.[1] There was no mistake about it: the Caucasian Matterhorn was found at last; only here we had one Matterhorn piled on another, and then multiplied by two. It was a sensation scene of Nature's own devising. The name of the mountain was unknown to us at the time; it was unmarked on the map, and our horsemen were sulky and uncommunicative. We learned afterwards that it is generally called Uschba."

---

[1] Central Caucasus and Bashan, pp. 329, 330.

[2] Tetnuld-tau.

Hardly less striking and to the advantage of the Caucasian giant is Mr. Grove's comparison[2] of Ushba and the Matterhorn: —

"If the mountain which rises over Zermatt were greater and steeper; if close to its eastern face rose another peak altogether resembling it; if the two were united by a vast curtain of precipitous rock ending some distance below the summit, — then would the likeness of Usch-Ba be presented to the eyes of travellers in Switzerland, and the overtopped Cervin be considered only as second to the mightier mountain. . . . If Usch-Ba ever is ascended, it will be by a traveller who takes with him two or three first-class Swiss guides, and is able to give one or two seasons to a careful examination of the mountain."

It appears, from Mr. Freshfield's account, that the pioneers of Kasbek, on their way to the conquest of Elbruz, dismissed as "insane" the idea of scaling either peak of Ushba, if indeed the thought suggested itself to their intelligence. In 1884 we find Mr. Freshfield still of the same mind; for in giving advice to intending visitors to the Caucasus, he recommends them to yield their tribute of admiration to the great mountain, and pass on. But in 1887, in company with M. de Déchy, he made a second tour of the Caucasus, and having first fallen into temptation, — as we may learn from his printed diary, — he was led, like many another in like case, to change his mind. In his entry[1] for July 29, we read: —

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[1] For a view of Ushba from near Betscho, see Alpine Journal, vol. xiii. p. 514, and Proceedings of the Royal Geographical Society, June, 1888, p. 340, an engraving from photograph by M. de Déchy; also in the Bolletino del Club Alpino Italiano, 1889, a phototype from a photograph by Signor Sella.

[2] The Frosty Caucasus, by F. C. Grove, 1875, p. 205.

> "I started at 5 P.M. with Michel and Joseph to reconnoitre Ushba. Long grass-walk up valley, then good steep horse-path through fir forest, and up flowery slopes to foot of Gul Glacier (*circa* 9,000 feet). Loitered at first, owing to doubtful weather. Sky clearing; pushed on fast up glacier, avoiding ice-fall by rocks on E. bank. Determined to make for rock-peak opposite Ushba, forming E. end of ridge descending from N. peak, and separating the small Betscho, or Gul, Glacier from the great Mestia Glacier. Steep upper slopes of névé in horrible condition. Took to rocks. 'Sped not our feet without the aid of hands.' Steep, but no real difficulty. More than two hours' hard climbing brought us to the ridge. Nasty ice-filled gully between first and second peak; three hours from glacier; ten hours from Betscho. Height about 12,500 feet (aneroid unluckily left behind), yet only the Hörnli, or foot-stool of Ushba. Wonderful and most interesting (to a climber) view of Ushba, its two peaks, and the great snow-ladder between them. Snow avalanches constantly falling over the cliffs and sliding down the slopes. The whole mountain hissing with snow, like a snake surprised by an enemy. Wish I could stamp on its head. *Faciam per alium, spero.*"

Describing the same reconnoissance in a most interesting article on "Suanetia," in the "Proceedings of the Royal Geographical Society" for June, 1888, the same writer says with fine enthusiasm: —

> "The summit [of Gulba] was a double-topped granite needle. We were rewarded by one of the most wonderful mountain views I have ever seen. The great towers of Ushba, so close one seemed almost able to touch them, still shot up 4,000 feet overhead; as many feet below spread the torn ice-fields of the Ushba Glacier. Beyond it rose two great spires of snow, — Schilidi Tau and Little Ushba. Other sports have their excitement; but can there be anything so delightful as
>
> 'To sit upon an Alp as on a throne,'
>
> particularly a throne no one has ever sat on before, and gaze on splendors that have been waiting since the Creation for some one

---

[1] Alpine Journal, vol. xiii. p. 359; for a more extended account, see Ibid., pp. 507-510.

to worship them? The Sleeping Beauty waited one hundred years. How many thousands have these Caucasian virgin summits dwelt — 'remote, serene, and inaccessible' — in their frosty solitude!

In descending we rode down in fifteen minutes, on little avalanches of our own starting, what had cost us two hours to climb. In better conditions of snow, Ushba itself may probably be ascended; but it will require, above all things, mountaineers of sound technical judgment."

We may not sit on Mr. Freshfield's Alp as on a throne, but our frontispiece makes us more truly realize the joy it would be to do so. His entire route in that reconnoissance is shown in our illustration. Just to the right of the twin giants — one of which partly hides its fellow — and nearly in line with the snowy face of Little Ushba, we see the Gul Glacier from where the Gulà-chalà flows from its foot to the upper *névés*. It branches just below a semicircle of crags. Gulba is on the right of the right arm, but its summit does not reach the sky-line. Imagine ourselves standing there with these towers of Ushba springing 4,000 feet above our heads, while the valley of Betscho lies about 1,000 feet farther below us than the Glen House when we are standing on the summit of Mount Washington!

The conquest of Ushba, unlike that of the Matterhorn, is the story of a single season. It was early in 1888 that Mr. Freshfield, quite converted, announced[1] that "in better conditions of snow, Ushba itself may probably be ascended." In August of that same year Mr. Donkin's party camped beside the moraine of the Gul Glacier, and laid a regular but unsuccessful siege to the peaks, thus described in a letter[2] from Mr. Donkin to his brother: —

BETSHO, Wed., Aug. 15, 1888.

I sit in a blazing sun at a rough wooden table outside a wooden sort of barrack called a Cancellaria, one room of which we have, in a small valley[3] which you may roughly compare with the Zermatt valley on a smaller scale, but with an enormously larger Matterhorn at the head of it, towards the left, — the great Ushba. It is still unclimbed. We have been here nearly a week, four days of which we spent in camp high up by the moraine under the mountain, and had two hard tries to get up the two twin peaks, but were beaten. The first time we tried the northeast and slightly higher peak, by going up the great snow couloir between them; the weather was fine but too warm, so the snow was not hard enough, and it became dangerous from avalanches. We had to keep upon the rocks at the side, which were very difficult, and at last it was a choice between the steep snow and its risks and a defeat; so, though you may imagine the disappointment, we turned back and came down again. Even then we were not free from risk; huge avalanches had already fallen, and we had to run and slide down the slopes as fast as we could, tumbling through the masses of ice and snow débris till we were clear of avalanche tracks and could take it easy. Even so, we were out for thirteen hours, and hard at work all the time. That was Saturday last. On Sunday we rested, and on Monday we had a try at the southwest peak from the south arête. This avoids all risk of avalanches, and we hoped for success. The telescope had shown that most of the route was easy except one hard bit below the top. It was an enormously long climb over the lower rocks and snow gullies, — nowhere very steep, but very tiring just because it was easy enough to go fast. At last, however, we were brought up against a cliff, — *the* great cliff which guards the top; and such a tremendous wall of forbidding precipice I never saw before. It is nearly half a mile wide; and a magnificent and spotless field of snow hangs below it, sweeping down at a fearfully steep angle into the valley below. We were on a ridge abutting against the right-hand end of the cliff, and anxiously did we scan it for a possible way up. In the middle was a great crack[1] from top to bottom, full of icicles; immediately over our heads the rocks went almost sheer up, solid and firm, but such little projections as there were sloped the wrong way and gave no hold whatever. Streich was not very well, and evidently did not think it possible. However, we put down all the baggage, and had a try at the lowest rocks. We got a little way up, a very little, and then got hopelessly stuck. Fox, who is a most enthusiastic climber, wanted to try the ice gully; but merely to get near it involved getting up an overhanging slab of vertical rock which I declared was impossible, — indeed I had mentally given it up on first inspection. Once up those four hundred feet or so of precipice, all would have been easy, as the top slope is gentle; but it was hopeless, so once more we had to accept defeat, and turned downwards. Before doing so, however, we built a little cairn, and I took a boiling-point to determine the height we were at, — nearly 15,000 feet. As we descended the interminable ridges of broken rock, the clouds swept up and a little snow fell, but lower down we got into finer weather again. Ushba is its proper name, — "the rain peak." Seldom is it free from clouds; but the first two days here it was clear, and I have got several good photographs of it. We had started at 2 A. M., and did not get back to camp till 6 P. M., — sixteen hours out and the hardest part left undone. . . .

---

[1] Proceedings of the Royal Geographical Society, vol. x. p. 841.

[2] Alpine Journal, vol. xiv. p. 311.

[3] This valley forms the foreground of our frontispiece.

---

[1] Plainly seen in frontispiece.

At the same time another adventurous party of Englishmen was in the Caucasus, executing perhaps the most remarkable campaign in the whole history of mountaineering,[1] — the party comprising Messrs. Cockin, Holder, and Woolley, with their Grindelwald guides. The last words ever written by Mr. Donkin, so far as is known, only six days before the disaster on Dych-tau, were a letter[2] to one of their number, bearing date of August 24. The postscript briefly announces the two failures on Ushba, and closes with the words: "Under good conditions the north peak should be accessible by the couloir." This sentence doubtless gave fresh courage and resolution to him who was destined first to set foot on the unconquered peak.

On September 4 Mr. Cockin's companions being obliged to return to England, they left him behind with the guides, and now was begun a series of successes unparalleled by any victor in this field. In ten days Mr. Cockin accomplished the first ascents of Shkara, Djanga, and the northern peak of Ushba. In these modest words[3] he gives the details of this final success: —

"I tried Ushba three times, always by the couloir. On the first attempt, September 22, we had to turn back after four hours, through Roth's illness. Severe rheumatic pains disabled him for more than a week after. Almer spiritedly agreed to go alone with me, and on the 24th he and I tried again. We lost time by going on to the ice-fall, finding what looked an easy way stopped by a schrund; and after Almer had cut steps for over four hours in ice, had to turn. There were then two days of bad weather, in which much fresh snow fell.

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[1] Compare note to page 3.

[2] Alpine Journal, vol. xiv. p. 190.

[3] Ibid., p. 199.

"Almer and I left our tent, pitched just beyond the last trees, at 3.08 A. M. on September 28. The fresh snow was in a safe condition, but soft, especially below the schrund at the foot of the slope beneath the rocks of the north peak, and above the ice-fall. We passed the schrund at 8.03, having breakfasted on the way. Above the schrund we kept on the slope close to, but never going on, the ice-fall. An avalanche had swept off some of the fresh snow from the slope, and the going was a little better. Almer had in the upper part to clean out some of our old steps. When near to the rocks of the north peak, we turned to our left. This brought us to the top of the ice-fall, right in the couloir between the rocks of the two peaks. We halted here, 10.5–10.45. The slope above was very steep, and the snow soft. At 1.10 Almer broke through the edge on the neck. We were near to the south peak; but as the ridge leading to the top of this had much frozen snow and ice on it, whilst the rocks on the north peak looked easy, we turned at once to our right. Almer had some step-cutting before we could get off the neck and reach the rocks of the north peak. These were not difficult. The top, which we reached at 3.45, was snow, the highest point being an overhanging cornice; this we looked over, but did not venture to tread upon. Almer put up a small stone man a few feet below. We stayed on the top till 4.22, but were in mist all the time, and could not ascertain whether the north peak was the higher or lower one. We had only a short look at the ridge from the neck to the top of the south peak, but were both inclined to think it would go, at any rate when clear of ice. At 4.22 we began the descent, and reached the tent at 11.20 by lantern-light."

And thus was Ushba conquered! Next to the joy of doing it one's self is doing it *per alium;* and in this joy Signor Sella has to a large extent permitted us to share.

To complete the chronicle to date, it only remains to add that the season of 1889 witnessed no new successes, though Mr. Wooley with a single guide, Jossi, succeeded, in a first trial on September 8, in gaining the saddle between the two peaks, but at too late an hour to warrant the going farther; while a second attempt four days later, with an additional guide, had to be abandoned at a point considerably lower.

The Cliff-Dwellings of the Mancos Cañons.

BY FREDERICK H. CHAPIN.

Read February 12, 1890.

BEYOND the southern Rockies, where Utah, Arizona, and New Mexico border upon Colorado's frontier lines, is a strange land, inhabited by strange people, and containing monuments and relics of yet stranger tribes of an unknown antiquity. From the melting snows of the lofty Sierras, rivers, far larger than those of the present day, have run to the south and west, cutting out a network of cañons in the sandstone plateau that give to the landscape an appearance resembling the face of the moon. Among some of these deep cuts and weird valleys dwell remnants of wild tribes which once hunted among the mountains to the north and east. All along the banks of the San Juan River and some of its tributaries are gathered bands of the Ute Indians, who in the more remote districts, far from the agencies of the reservation, live a primitive life. Over the Colorado line in Arizona is the reservation of the Navajo Indians, and to the south and west of them are the pueblos of the Zuñis and Moquis. These latter live in communistic towns, built of stone and adobe, and are supposed to be the descendants of the prehistoric race,—a once numerous people, the ruins of whose edifices are found here upon cliff and in valley throughout a broad zone. They were known in early times to the Spaniards, through rumors brought to the ears of Nuño de Guzman in 1530, when he was at the head of affairs in Mexico.[1]

A few years later they were seen by Cabeça de Vaca; and influenced by his reports, Coronado made his famous march from Compostello to the plains east of the Rockies. The existence of the primitive people, and the fact that the country contained archæological remains of great interest seem to have been lost sight of till the middle of the present century,

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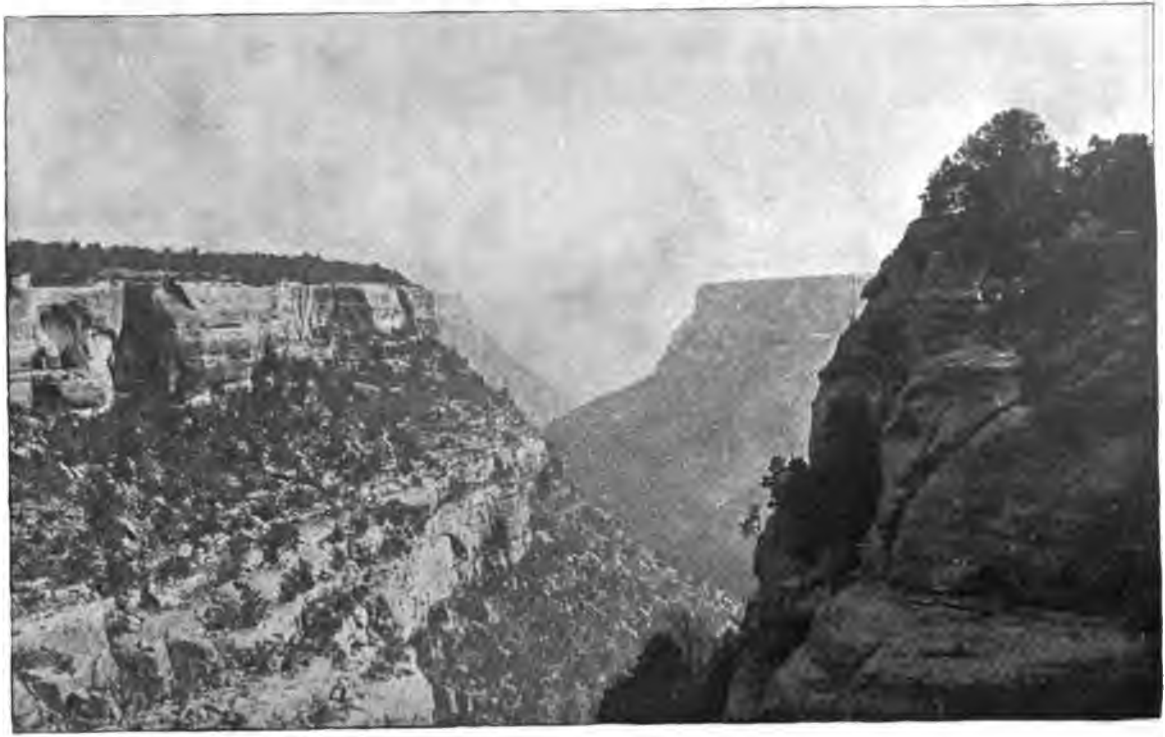
[1] Narrative and Critical History of America, edited by Justin Winsor: article, "Early Exploration of New Mexico," by Henry W. Haynes, vol. ii. pp. 474 *et seq.*



VIEW DOWN CLIFF CAÑON.

From a Photograph by Frederick H. Chapin.

when the exploring parties of the United States Government[1] rediscovered, as it were, the homes of many of the Pueblos, for the most part inhabited dwellings of stone and adobe.[2] Lieutenant Simpson, however, discovered in Chaco Cañon (northern New Mexico) deserted ruins of a people called "Cliff-dwellers," the presumed ancestors of the present Moquis and Zuñis.[3]

So far as all records go to prove, no explorations of importance were made farther to the north and within the limits of Colorado till the expedition of the Hayden Survey in 1874–1876.[4] Mr. William H. Holmes, geologist of the San Juan division, examined many ruins in the valleys and upon the cliffs. Mr. W. H. Jackson, the skilful photographer of the Survey, made a very thorough search for architectural remains in Mancos, McElmo, Hovenweep, and Montezuma Cañons, and in the Chaco Cañon had the fortune to find a skull which belonged to the race of Cliff-dwellers. The illustrations made from Mr. Jackson's admirable photographs, as well as the photographs themselves, attracted much attention to these marvellous ruins.

But it must be remembered that the ground covered by these remains embraces a section of many thousand square miles,[5] and only a small area of so large a territory could be explored in three summers. In those early days, too, the travellers were exposed to all manner of hardships, were far from a base of supplies, and were at times in danger from hostile Indians. Thus it was with the Mancos region in which many very interesting ruins were found, and which locality perhaps gives the finest examples of the remains of works of masonry in the West. The explorers had time only to pass through the main cañon, while recent developments have shown that the tributary gorges contain by far the grandest ruins of the lost people. Even until within a few years the hostility of the Utes has rendered it dangerous for a white man to venture down the Mancos River without military escort; so that it is not till very recently that much has been discovered to add to the important revelations of Holmes and Jackson.

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[1] Notes of a Military Reconnoissance, etc., by Lieut. Col. W. A. Emory, 1846–1847; Journal of a Military Reconnoissance, etc., by Lieut. J. A. Simpson, 1848. Also compare Report of the Exploring Expedition under Captain Macomb, Geology, by J. S. Newberry, 1876, p. 79; J. W. Powell, Scribner's Monthly, January–March, 1875; Official Report of the Exploration of the Colorado River, Washington, 1875; J. Gregg, Commerce of the Prairies, New York, 1844.

[2] Dr. Oscar Loew, in "Report of the Chief of Engineers, 1875," gives the population of Pueblos at that time as eight thousand.

[3] See also discoveries by Lieutenants Whipple and Birnie, Ibid.

[4] Dr. F. M. Endlich examined the ruins in the valley of the Rio de las Animas. See Hayden's Report for 1875.

[5] Hayden's Report for 1876, p. 388: "Mr. Holmes's territory covered six thousand square miles."

It is to Messrs. Richard and Alfred Wetherill, of the village of Mancos, that these new discoveries are chiefly due. They are the owners of large herds of cattle, which roam through the valleys and over the mesas, often straying down into the land of the Utes, whither long rides are required to bring them back to the settlement. In taking these excursions, Richard especially has discovered many cliff-houses of great interest in Navajo, Moccasin, Acowitz, Cliff, and other side cañons of the Mancos, and has given many of these abandoned dwellings a careful examination; but all his previous discoveries pale before the remarkable one made on Dec. 8, 1888.

On that day he was riding on the mesa, looking for some strayed cattle. As was his custom, he scanned thoroughly all the little side cañons as he passed the brink of the precipices, in the fascinating search for vestiges of the ancient people. Upon reaching the verge of the right-hand gorge of the left-hand fork of Cliff Cañon, a western branch of the Mancos, a locality which he had never chanced to visit before, he saw over the deep gulf and under a projecting cliff on the eastern side the grandest collection of stone buildings yet discovered in the Mancos district. In appearance it was like a ruined fortress, with towers, ramparts, and bastions, — an astonishing sight, and all in a fair state of preservation. Returning towards the ranch, he met a party of hunters, among whom was Mr. Charles McLoyd, of Durango, whom he succeeded in interesting in his discovery to such an extent that several of them spent some three months in excavating among the different ruins; and the result of their work now rests in the rooms of the Historical Society of Colorado, at Denver. Besides the numerous nearly perfect specimens of jars, bowls, knives, needles, baskets, cloth, matting, etc., eighteen skulls were found, all articles of great interest to the student of ethnology and archæology. Hitherto, excepting a few relics found by Richard Wetherill, only broken pottery or inferior articles have been picked up. Only one skull had been discovered, — that found in Chaco Cañon, to which I have already referred.

It was this wonder-land which my companion, Mr. C. P. Howard, and myself had made the chief objective point of a visit to Colorado. In reaching it, the mountains had not been neglected, — ascents of Pike's Peak and Mt. Sneffles, of the San Juan Range, having been made by us, — and on September 18 we found ourselves at Durango, a station on the Denver and Rio Grande Railroad. At this place it seemed difficult to obtain much information in regard to the Mancos country, but the name of Wetherill's ranch was given to us as the best place to go to. That same evening we engaged a two-horse conveyance, and in the morning started for a thirty-mile drive westward over the mesa, toward Mancos.[1]

The drive was a very interesting one. Leaving Durango at 7.55 A. M., we passed through a country of coal-mines, and reached the top of the mesa at 9.30 A. M. Here the Fort Lewis road continues west. Our way led to the right, or north, and we had views of the near La-Plata Mountains. In another hour we reached the ranch of Osmond and Le Conte; here we were interested in the large fields of grain. At 11.30 o'clock we put up at Dick's ranch, where we rested our horses for an hour and twenty minutes, and had our dinner. Around this ranch are very tall pine-trees. The proprietor raises about forty tons of hay annually, and crops of oats, wheat, and potatoes. These facts all entertained us, for we had supposed we were about to enter a semi-desert. There is hardly any dew here. Sometimes as much as thirty inches of snow falls in fierce winter storms, but it disappears very quickly. Coal, on which the hopes of Durango largely rest, is found near by, and there are placer-mines on the high mesas to the north.

An hour beyond Dick's ranch we came to the edge of the mesa, and could look down upon the valley of Mancos. It was a great surprise. Instead of a parched and arid region, we were looking upon a beautiful land where great fields of golden grain covered hillside and valley. Point Lookout, the great terrace-like table-land, or mesa-verde, upon the west side of the entrance to Mancos Cañon, looked like the abutment to a mighty bridge. The imposing Ute Peak rose beyond it in the west; and far over the plain were seen dim, hazy mountains. Driving hurriedly down the steep mesa, we passed the little cluster of houses which constitutes the village, and reached Wetherill's ranch at 3.40 P. M.

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[1] It would have been better to take the stage to Mancos, but we were uncertain about our ability to obtain saddle-horses there; so we drove horses which we afterwards used on our expedition. We found, however, that we might have obtained plenty of ponies at Mancos.

We were cordially welcomed, and immediately felt at home. With the head of the house, Mr. B. K. Wetherill, it is the same old story as with many pioneers. Years ago, in poor health and with little money, he rode a pony across the plains from the Missouri River and took up a claim in this remote valley. With the help of four strong sons, all has prospered. The soil, by irrigation, yields good crops; many horses pasture near, and hundreds of cattle roam the mesas. Everything about the ranch gave evidence of thrift and comfort. The barns were large and well filled, and enormous stacks of hay and straw were near the corral. The house, built of logs placed upon the terrace of an ancient river-bed, is strong and compact. The dining-room, an important factor, is large, and has a big fireplace. The farm has been named the "Alamo Ranch." Eight years ago, not a tree stood near it. Water runs in an irrigating channel through the yard and garden; and cottonwood-trees, planted within a few years, give a grateful shade. The whole neighboring scene is a pastoral one; a home has been established in the wilderness of sage-brush and piñon-pine. Very beautiful in the distant background are the La Plata Mountains, seen from the hillsides and from the meadows. The form and structure of Hesperis Peak are especially remarkable; great bands stretch across it, showing the geological structure, even at the distance of fifteen miles. Towards evening we went with Mr. Wetherill to see some old ruins near the ranch, by the roadside. They appear like natural mounds, or heaps of stone, but close scrutiny refers their origin to human hands. Broken pottery is strewn all around. Much time would be required to determine the limits and size of the village or city, for it was of considerable extent.

Tumbled-down walls cover a large field. We took two photographs to show the location of the debris. There was a lovely sunset, the rays lingering long on the La Plata Mountains.

On our arrival in the afternoon, we had found only Mr. and Mrs. Wetherill at home. Their eldest son, Richard, to whom I have already referred, and who knows the country better than any other man, was absent on a long ride after some strayed horses. Two other sons were on far journeys of similar pursuit; and John, a younger brother, was down in Mancos Cañon for a day's trip to some of the first cliff-houses. Our plans were therefore in an uncertain state; but at dark Richard rode into the corral, and a grand trip was assured us. That evening we made plans for a sojourn among the cañons to the south. We found our new friend both agreeable and well-informed, and we sat before the fire till late into the night and heard the story of the Mancos valley. It appears that what had been a hindrance to others had never deterred him from entering the wild regions; for though the Utes had but recently made way with an adventurer who had strolled into their domain, yet even during the skirmishing warfare of only a few years since, the friendly intercourse between the Wetherill family and the Indians had never been broken, and they exchanged visits all through the period of the border fights. Richard gave us many facts of interest, some of which we found confirmed by our own investigations. Much of the interest this paper may possess is due to information given directly by him to us, and for which he must be given full and entire credit. It is only unfortunate that he is not inclined to write out his own observations and his deductions from them.

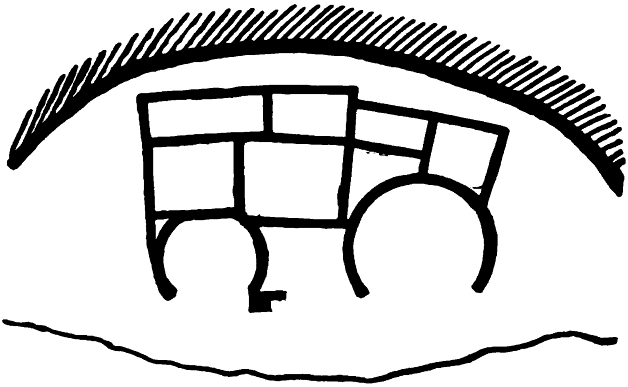
The weather had been very warm and dry, and as we turned in Richard remarked: "How much better time we should have, if we could only have rain!" His wish was fulfilled, for torrents came down in the night. Scarcity of good water is the scourge of the country. Mancos River is an alkali stream; the springs, rarely found, are alkaline; but when much rain falls, the river water is improved.

In the morning the landscape was bright and fresh, and we had occasional showers till eight o'clock. After some delay, the mule "Jiffy" was loaded up with a supply of bedding, provisions, and a spade, and as mounted men at 10.40 A. M., we rode off toward the entrance of the cañon.

Mancos Cañon is about forty miles long. The distance is called thirty-seven miles to a tower near the southern end, which is described by Mr. Jackson in Hayden's Report. The width at that place is about three miles. In the narrower portions the gorge is perhaps half a mile wide. At the opening, where we rode along to the south, the mesa walls, like great portals, are separated about five miles, with a sloping, nearly level tract between. It was not our intention to go the whole length of the valley, but to ride about six hours, — a distance of some twenty-five miles, camp there, and explore a more promising locality among the lateral cañons upon the east and west sides. In carrying out our plans, we were guided by Richard's experience, who had found that it was much easier to reach the heads of the tributary gorges by riding over the tops of the mesas, than to follow the ravines up from their junction with the main stream.

We had gained but a short distance when we met John Wetherill's party returning. We stopped their pack-horse "Kaiser," and headed him to the south, much to his sorrow; but we needed his services and the contents of the pack which he carried. John hurried to the ranch, promising to return and follow us after dining and feeding his horse. He overtook us late in the afternoon, and proved of great assistance. After fording the Mancos River, — here only worthy the name of creek, — our path was henceforth only an Indian trail. In about an hour we passed Armstrong's, the last ranch, and at half-past one o'clock were at the mouth of Webber Cañon, the first tributary gorge on the left or eastern side. Here are located numerous mounds, similar to those near Wetherill's ranch. Sandstone was used in the building. Excavations previously made by Richard showed regular walls; and in graves opened by him bones of the ancient people were found.

At quarter-past three we came opposite to a ruined structure placed high above us on the right, — a very picturesque cliff-house; and though it has been visited often, we thought it worth a little climb to see it in detail. It took us but ten minutes to reach it from the trail below. The ruins are placed under an arched cliff, the space of which we estimated at thirty feet high in front, and eighteen feet high in the rear where the masonry jutted against the roof. All the space under the cliff, perhaps a hundred feet in length, had evidently been covered with the structure. While I was making notes, my companion made a ground plan which I am able to present here. The measurements were obtained by pacing off the different rooms. The walls, generally twelve inches thick, are sixteen inches thick in circular house; the plan so represents it. The material used in the building was sandstone, of the same composition as the surrounding cliffs. The stones of the walls of the house were fairly well faced. Mortar was used, taken from the dust near at hand. Some of the walls had been plastered with material taken from the river-bed; it was put on with the hands, the finger-marks showing the manner of doing the work. Now standing there are six front rooms, only three of which are well preserved. Two of them are circular.[1] In the north enclosure is a painting of a small-sized hand in red. On one of the walls is a human figure five inches and three quarters high, represented playing a flute-like instrument.[2]



Plan of 1st CLIFF DWELLING Mancos Cañon.

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[1] See Plate III.

[2] A flute was found in a cliff-house, and is now in the Denver collection.

The floors of the rooms are pretty well demolished. From the north apartment, a peculiarly shaped door leads into a back chamber. But for the fact that it is the entrance to an enclosure which could have had no light, one would be inclined to take it for a window. The lintel is a charred cedar stick; there is a good stone sill. This house fronts the east. Upon the opposite side of the cañon, quite low down, is one building, and high up on the cliff is another. They are both small, and difficult to detect with the naked eye. It has been stated as a fact heretofore that all the houses were built upon the western side of the cañon, so that the rising sun could shine into them.[1] This is an error; indeed some of the finest ruins have been discovered upon the eastern face of the cliffs.

After taking several photographs at this ruin, at five o'clock we took our departure. John Wetherill, accompanied by his watch-dog, joined us at the trail. Soon the path left the proximity of the river, and by numerous obstacles was crowded high up on a terrace on the west side and above the trees, so that we obtained a clear view of the opposite walls and steep slopes. Suddenly we saw a drove of horses upon the hillside, and following them rode an Indian with a little Ute sitting behind him astride the steed. The red-man caught sight of our "outfit," and for a long time regarded us with a stern curiosity. He evidently considered us as intruders in his domain. He was a picturesque sight; without covering for his head, his black hair flowing down his neck, and with a blanket over his shoulders. He did not take his eyes from us till we had passed down into the brush in the river-bottom.

While we were under the sheltering cliffs which protected the ruins, a heavy shower passed over. We thought that we had escaped a wetting, but the bushes and trees were so damp that we got pretty well soaked, and before reaching our proposed camping-place we were treated to a deluge from the skies. We pitched camp at quarter of seven in a clump of box-elders, at a point a little above the entrance to Cliff Cañon, a tributary of the Mancos from the west. The branches were

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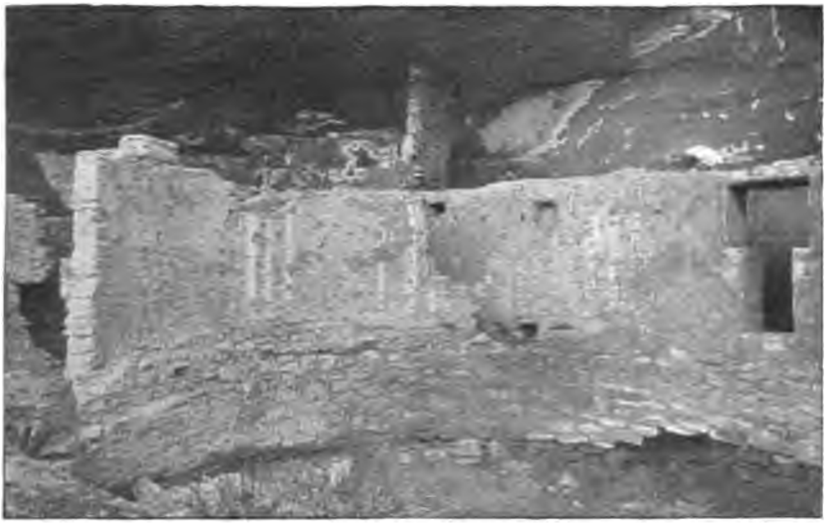
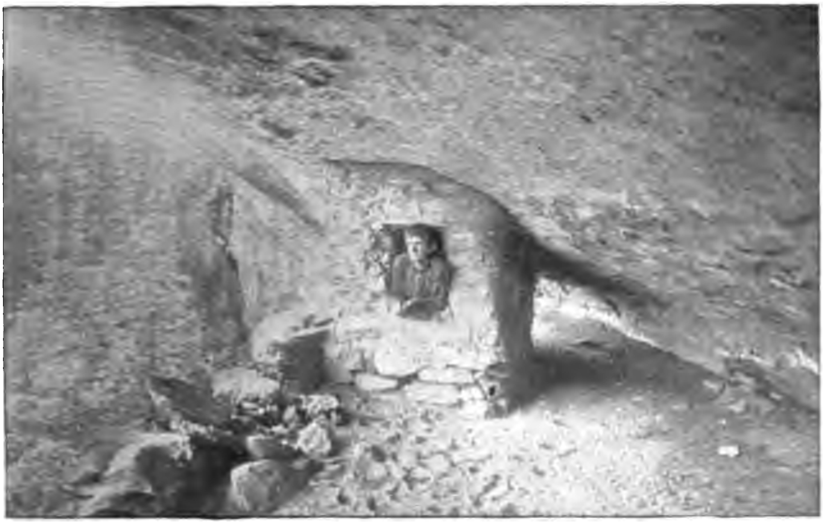
[1] Crest of the Continent, page 160; also Hayden's Report, 1876, W. H. Jackson, p. 376.



INTERIOR OF CIRCULAR ROOM (Mancos Cañon).



CLIFF HOUSE IN ACOWITZ CAÑON.

From Photographs by Frederick H. Chapin.

so wet from a passing shower that we could not cut any boughs for a bed; so stretching a wagon canvas (which had covered one of the packs) from two trees to keep off the rain, we spread blankets on the ground and then dried ourselves off by the camp fire. The river ran very near our camp. The liquid was disagreeable to the taste and very muddy. John bailed some from a pool that contained water that had overflowed from the stream, and thus had had time to settle. The disagreeable flavor is not noticeable in coffee, but boiling the water alone does not seem to improve it. The night was pitch-dark, and we could see nothing when far from the fire. Rain continued through the early part of the evening.

We were up at half-past six; despatched breakfast of bacon and coffee in short notice; and leaving John to arrange camp and saddle our beasts, Mr. Howard, Richard, and myself scrambled up the eastern side of the cañon to a height of about two hundred feet, to obtain a glimpse of a cliff-house perched high up on the western side. This little ruin is difficult of detection without a glass, but when once seen is instantly recognized. It seems quite inaccessible, but is reached without much difficulty. The cañon walls are very bold and striking. A grand tower stands at the entrance to Box Cañon,[1] in which there are a number of small houses which have never been entered or explored in any way. Our camp, in the trees below, with the ascending smoke, was very picturesque. Upon the opposite cliff coal showed in seams.

Returning to our temporary home, we all started at nine o'clock with three horses and the mule, to ascend to the top of the steep mesa on the east, journeying by a rough Indian trail. We were bound for some ruins in Acowitz Cañon.[2] Near the trail a sharp ridge or dyke of igneous rock has been thrust up through the sandstone. In twenty minutes we were forced to dismount and lead our horses the rest of the way; and as much more time spent in hard walking brought us to the plateau, perhaps eighteen hundred feet above the river. From this point is obtained a good view of houses in Cliff and Mancos Cañons, also an outlook toward the western mountains, the Sierra El Late. An hour's ride across country, over a comparatively level tract, through piñon-pine and junipers, brought us to a fork of Acowitz Cañon, in which are antiquities well worth investigation by the archæologist. We tied our horses to trees at some distance from the great ravine. Here, as on the edges of many of the other chasms, there is no soil, grass, or trees within several hundred feet of the brink. The surface is smooth sandstone, with here and there great hollows filled with rain-water. These places are called "tanks" by the ranchmen, and are the only water-supply for deer or cattle on the mesa.

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[1] A short cañon so-called; though all the very short cañons are thus designated, because they end abruptly against high cliffs, and thus differ from the long lateral gorges, some of which can be gotten into easily from the upper extremities.

[2] This was formerly called Johnson's Cañon, for the simple reason that a man by that name once wintered some cattle down in the bottom of the gorge. As some of the other cañons have Indian names, it would seem quite appropriate to give this one a similar designation.

The group of ruins which we proposed to photograph, to be exact, is situated on the western cliff of the third left-hand fork of Acowitz Cañon. The structures are invisible from above on the same side, neither is there any way of descending to them; so we worked our way around to the eastern side, and there found a wall which must have been used as a fortification. Originally the breastwork was built with great care, for the stones are regular in shape and have been cut and faced. But few of them remain as placed by the builders; yet this little rampart gives a clew to the explorer who is hunting for a way down into the cañon. Stepping over the tumbled-down walls and looking down the precipice, we found hewn steps on the face of the cliff, and descending by them, as members of the tribes must have done, — as perhaps their ferocious adversaries may have done also, — we soon reached the bottom of the gorge, and hurriedly scrambled up to the interesting ruins.

A strange, wild, lonely cañon! No sounds were heard to disturb the scene but the croaking of ravens as they flew over our heads. The great arched cliff hangs high above the ruins; but a little way from it the cañon ends in solid sheer walls, which sweep around in a curve. Looking all about we see but one exit above, and that by the steps which we had descended.

Perched in a little cleft over our heads was a second group of masonry, apparently inaccessible and in good repair. I suggested that we try to scale the cliff. Richard thought it impossible, and pointed to the trunk of a tree that leaned against the ledge, which he had placed there and which failed by some six feet of reaching the rounding sandstone terrace above. While our companions were rummaging around the lower rooms, John and I tried our luck in squirming up the tree. It was of no use; we could not reach far enough, and there was not the slightest hold or crevice for the fingers. We got an old beam from the ruined floors, which was a trifle longer than the log, and fastening a rope to one end, placed the timber up against the cliff by the side of the other stick. With the aid of the rope we could gain the top of the timber with less expenditure of force. We made several attempts in vain to gain the ledge, each time being obliged to come down to rest; but at last my companion, whose arms and legs were of long reach, after removing much dust and debris, was able to get a hand-hold, and clambered up. I followed him; and calling to our friends, they sent up the spade and camera, then mounted after us, and we entered the mysterious rooms.

How long since human foot had trodden this sandstone floor? Surely not since the forgotten prehistoric race had deserted the caves. Certainly no white man had ever entered these walls before, and the superstitious Ute would not dare to venture under the shadow of the cliff. After our difficult tussle in scaling the wall, we thought we might be rewarded by finding some rare specimen of the skill in ceramic art known to the dwellers among the caves, — perhaps a graceful pitcher, or a water-jar, standing on a shelf waiting to be called for; but on the contrary there was an air of desolation around the vacated quarters. It was cleaner than the ruin below, and showed no signs of being a burial-place, or ground in which it would be profitable to dig. Undoubtedly the best places for such examination are in the lower ruins.

But we found the little relic of a bygone people unique and interesting. We now made some photographs of the strange structures. The outer walls had been built upon the edge of the ledge, and to investigate the different rooms we were obliged to bend or crawl back of them, for the cliff was very low in the rear. In one of the rooms we dug a little, but found nothing. The door to this room is of peculiar shape, being wider at the bottom than at the top; we could see no reason for it. The floor of the ledge was covered with fine dust; when disturbed by the spade it raised a choking cloud, that forced the would-be excavator to beat a retreat. On the south corner is a very funny little building, to which there is one entrance.[1] This again one would take for a window, but that, when the whole wall was standing, no light could pass through it. The race of Cliff-dwellers were not liberal of space when they built their doors, for we did not find one high enough to pass through without bending.

It was a fascinatingly queer place; but we must away, for time-consuming caution must be used in the retreat from our citadel. The rope made our descent comparatively easy. My friend and Richard went down first; then we lowered the plates and camera, threw the spade after them, and I followed. John, as the last man, looped the rope around a pile of masonry and let himself down. He reached out and got hold of the tree in safety; but by a little sliding of the cord a big rock was dislodged, which in falling crashed upon the package of dry plates, and I have two less pictures to show than would otherwise have been the case.

We now set to work to explore and photograph the lower structure. Many parts were in a good state of preservation; sticks and supports were still intact. Floors were made of sills of cedar; willow sticks were then laid over, and the whole was covered with plaster. In most cases the floors have fallen in. We noticed some peculiar arrangements: one such was a sort of low cubby-hole, outside of the main structure, which was eight feet front and five feet deep, with two little doors. This may have been used as a store-room. We found much broken pottery; among the rest fragments of large bowls, which it would be possible to partially restore. One very remarkable thing which showed the eccentricity of the builders, was a room that appeared to have no entrance: In fact I walked around it once without discovering that I had passed a room. A little investigation revealed an entrance from the top. The enclosure was eight feet square; the entrance a hole with an aperture of seventeen and a half inches. The ceiling of wood was plastered over, and was very firm. Any photographers who may be looking for a dark room in which to change plates at mid-day when in this locality, will find this room as good a place as could be desired. From its top I took a photograph of one end of the edifice, as it was a good view-point. Mr. Howard took advantage of this position to photograph some interesting grooves on a ledge of smooth sandstone, which is at the base of the walls. This he accomplished by placing the camera flat on the roof of the enclosed room, and letting the lens hang over. These holes in the rock were made by the natives in sharpening their tools; they were large and probably used for grinding axe-edges. On another ledge we observed smaller grooves, where awls, knives, and needles were whetted. One of the central rooms is well plastered, smooth as a modern wall. A round room had piers below the ground floor. These piers are plastered also. In the sides of the walls were little recesses which may have been used as shelves. There is a door similar to the one that we saw and photographed in Mancos Cañon. Above this door the walls are hollow.

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[1] See Plate III.

We had not the time at our disposal to excavate among the rubbish, but we poked around enough to show that it would be easy work to unearth many relics. A little scraping away of the debris revealed human bones, cloths, matting, etc. In walking among these ruins, one passes over tumbled-down walls, and crosses remnants of shaky floors of charred cedar. My companion noticed fossil shell impressions on a stone which had been used in the building.[1]

We left this interesting spot at 2.15 P. M., Mr. Howard and John returning to camp, while Richard and I started off on a tour of investigation. We discovered some houses in the fourth left-hand fork of Acowitz Cañon, a place that has

[1] Hayden's Report, 1876, W. H. Holmes, "Ruins at Aztec Springs." "The stone used is chiefly of the fossiliferous limestone that outcrops along the base of the Mesa Verde a mile or more away, and its transportation to this place has doubtless been a great work for a people so totally without facilities."

never been visited before. Here stands a good circular room, with two windows. On the sandstone plateau, near the brink of the gorge, is the most remarkable crack that I ever saw. I called Richard's attention to it, and I hope he will show it to people who may travel with him in future. In a land where erosion has played such a part in modelling the face of the country, a crack is phenomenal. Unfortunately I made no measurements and cannot give a reliable description; but it was more than a hundred feet long and about a foot in width. It was inclined at a considerable angle, and the bottom could not be seen.

From this fork we went far up on the main Acowitz Cañon, leaving our horses behind. From one of its pockets we had remarkable views down its whole length to the Mancos, and then through that depression to the magnificent mesa which stands above the river's place of exit. It was a truly sublime sight. The nearer scene is a wild one; quaking aspens grow in the upper part of the gorge, and in the bottom are tall stately pines, which climb to the height of the top walls, and were even with our eyes as we looked across the cañon.

I lost, from a stupid double-exposure, several very interesting negatives of a weird ruin, almost inaccessible, which occupies a secluded cavern in this cañon. One single picture, however, is left to me, which shows the remarkable structure of the cliffs, and the beautiful curve which they make as they sweep round to the east. What a dark and gloomy place, too, did these people select for their home or fortress, whichever name we may give to it! A stronghold surely it was, impregnable to a foe armed only with arrows and clubs. The great cliff spanning over it shielded the inhabitants from all attack from the table-land over them; and the vertical cliffs below could not be scaled when rocks were being hurled from battlement and tower above. As the sun was sinking in the west we could not examine closer this remote structure, but hurried back to our steeds, and reached our quarters long after dark.

The next morning we broke camp at nine o'clock and were *en route* for the mesa between Cliff and Navajo Cañons, to explore this time a western tributary of the Mancos. We were minus the services of a valuable animal. The mule, though hobbled, had managed to escape, and was probably gathered into the Indians' drove. "Kaiser" must pack a double burden. After an hour's riding to the south, we came upon old Indian wickyups; in a few minutes more, we rode by some which were comparatively new; and at eleven o'clock the yelping of many curs announced our arrival at an encampment, — the temporary home of Tabayo, the Ute we had seen tending his horses the day before. After some vain negotiations for the privilege of photographing the family of this surly child of the wilderness, we rode on down the valley, and soon came to more mound ruins. Within a short distance of each other, two towers are standing, possibly the watch-towers of the early explorers. What remains of the higher one is twelve feet in diameter. There are ruins near the latter, which are thirty-six feet in diameter; the building does not show great skill, as the stones of the walls do not break joints.

After photographing the towers, we turned up a rocky path to climb the mesa. Far down the cañon — which here was of wide expanse, and very level — we spied the smoke of a larger Indian encampment. Suddenly a mounted red-skin emerged from the group of wickyups, and galloped wildly over the plain. As we mounted higher he put spurs to his horse and soon overtook us. With only a glance at those of us who were behind, he rode up to Richard and took his proffered hand; yet there was mischief in his look as he demanded our intentions. Our guide pointed out the direction of our journey over the mesa and home by a westward route, and added to his sign language the words "one sleep." The Ute observed our spade; he seemed dissatisfied. Then he expostulated in Ute, Spanish, and English, so mixed up in vocabulary that it was difficult to comprehend; but out of the jargon I caught the following ideas: "White man rich, Indian poor. White man dig up Moquis, make Ute sick. Little Ute, big Ute, all heap sick."[1] He made a motion indicative of process of excavation, and with a threatening, superstitious look seemed bound to prevent any such sacrilege of the graves of the departed tribes. Richard insisted that we did not intend to disturb the bones of the Moquis, but were to photograph them. This latter operation he explained by pointing to our apparatus, and going through the motions of looking through glass. Wap (for such was his name) now made a demand for toll, for the privilege of going over the mesa; but Richard, pointing to the high-climbing sun, answered, "Ken [Quien] sabe." As we turned away, Wap exclaimed, "No money, Richard no come back in Cañon." The Ute stood motionless, regarding us till we were high among the upper cliffs of the cañon, when he turned wrathfully away and galloped to the north toward Tabayo's wickyups. I must confess that I watched these tents till they were well out of sight, for I feared to see Wap and Tabayo mount their ponies and gallop down toward the lower encampment, where generally a dozen or more braves are to be found. Such a force, if gathered, could have compelled us to return to Mancos, thus frustrating the important plan of our expedition. We were not even armed to show bluster if threatened, a rickety revolver in Richard's belt being the only weapon in the outfit.

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[1] This reference of Wap to the Moquis shows that the Utes have a tradition that the Moquis are the descendants of the Cliff-dwellers.

After a long ride we reached a camping-ground at the head of a branch of the left-hand fork of Cliff Cañon. Hurriedly unpacking, we hobbled the horses that were the most likely to stray far, and taking along our photographic kit, wended our way on foot toward that remarkable group of ruins of which I have already spoken, and which Richard has called "the Cliff-Palace."[1] At about three o'clock we reached the brink of the cañon opposite the wonderful structure. Surely its discoverer had not overstated the beauty and magnitude of this strange ruin. There it was, occupying a great oval space under a grand cliff wonderful to behold, appearing like an immense ruined castle with dismantled towers. The stones in front were broken away, but behind them rose the walls of a second story; and in the rear of these, in under the dark cavern, stood the third tier of masonry. Still farther back

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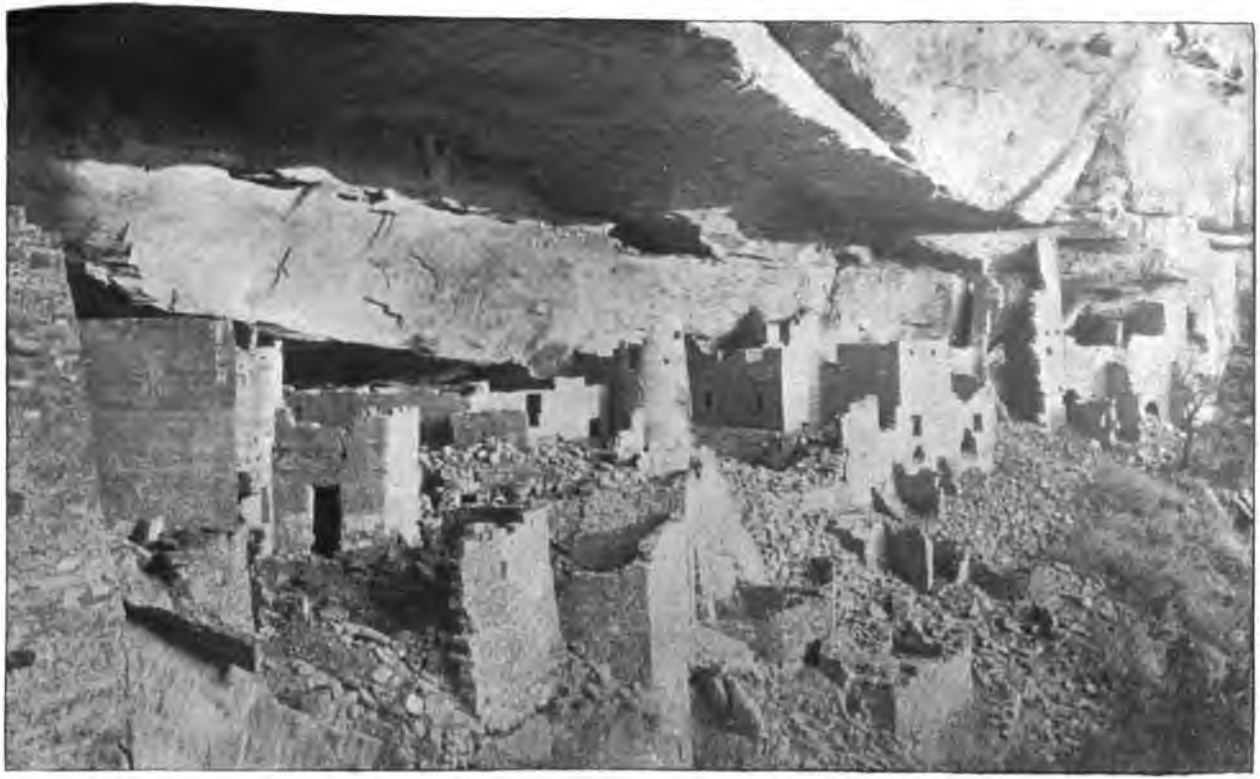
[1] Investigation shows that it was a communistic dwelling.

Plate IV



RUIN IN CLIFF CAÑON, FROM THE NORTH END.

From a Photograph by Frederick H. Chapin.

in the gloomy recess, little houses rested on upper ledges. A short distance down the cañon are cosey buildings perched in utterly inaccessible nooks. The neighboring scenery is marvellous; the view down the cañon to the Mancos is alone worth the journey to see.[1]

We stopped to take a few views, and then commenced the descent into the gulf below. What would otherwise have been a hazardous proceeding, was rendered easy by using the steps which had been cut in the wall by the builders of the fortress. There are fifteen of these scooped-out hollows in the rock, which covered perhaps half of the distance down the precipice. At that point the cliff had probably fallen away; but luckily for our purpose, a dead tree leaned against the wall, and descending into its branches we reached the base of the parapet. In the bed of the cañon is a secondary gulch, which required care in descending. We hung a rope or lasso over some steep, smooth ledges, and let ourselves down by it. We left it hanging there and used it to ascend by on our return.

Nearer approach increased our interest in the marvel. From the south end of the ruin, which we first attained, trees hide the northern walls, yet the view is beautiful. We remained long, and ransacked the structure from one end to the other. According to Richard's measurements, the space covered by the building is 425 feet long, 80 feet high in front, and 80 feet deep in the centre. One hundred and twenty-four rooms have been traced on the ground floor, and a thousand people may have lived within its confines.[2]

So many walls have fallen that it is difficult to reconstruct the building in imagination; but the photographs show that there must have been many stories. There are towers and circular rooms, square and rectangular enclosures; yet all with a seeming symmetry, though in some places the walls look as if they were put up as additions in later periods. One of the towers is barrel-shaped; other circles are true. The diameter of one circular room, or estufa, is sixteen feet and six inches. There are six piers, which are well plastered. There are five recess-holes, which appear as if constructed for shelves. In several rooms we observed good fireplaces.[1] In another room, where the outer walls have fallen away, we found that an attempt had been made at ornamentation: a broad band had been painted across the wall, and above it is a peculiar decoration which shows in one of our photographs. The lines were similar to embellishment on pottery which we found.[2] We observed in one place corn-cobs imbedded in the plaster in the walls, showing that the cob is as old as that portion of the dwelling. The cobs, as well as kernels of corn[3] which we found, are of small size, similar to what the Ute squaws raise now without irrigation. We found a large stone mortar, which may have been used to grind the corn. Broken pottery was everywhere; like specimens in the other cliff-houses, it was similar in design to that which we picked up in the valley ruins near Wetherill's ranch, convincing us of the identity of the builders of the two classes of ruins. We also found parts of skulls and bones, fragments of weapons, and pieces of cloth. One nearly complete skeleton lies on a wall waiting for some future antiquarian. The burial-place of the clan was down under the rear of the cave.

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[1] See Plate II.

[2] See Plate IV.

While among these ruins one is led to speculate upon their age. It is a question difficult to decide, or to give any opinion upon. Located in a dry climate, protected from all aerial forces, there is no reason why, if unmolested, the walls should not stand a thousand years essentially as we now see them; and there is no reason to doubt that they may have stood a thousand years in the past. The valley ruins have gone a long way farther toward complete destruction than the cliff-dwellings. This has led one authority to suggest that the cliff-houses "owe their construction to events that immediately preceded the expulsion of the pueblo tribes from this district." The same authority also states that "the final abandonment of the cliff and cave dwellings has occurred at a comparatively recent date, certainly subsequent to the Spanish conquest."[1] But allowing that the cliff-houses were deserted only three hundred years ago, this would not help us to assign a date for the building of some of the larger structures, which, from what we know of the tools employed, must have been the work of time. Not a scrap of metal has been found in the debris which rest upon and among the tumbled-down walls. Most of the stones that were employed in the rearing of the great edifice must have been laboriously shaped by an almost shapeless stone axe. Such work, carried on under so great difficulties, did not allow of villages being constructed in a day.

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[1] Fireplaces have been rarely observed among the cliff-dwellings. Mr. Holmes writes of one in Mancos Cañon, in "Hayden's Report," 1876. See illustration, pl. xxxiii. fig. 6.

[2] The pottery is either indented or ornamented with lines or scrolls. Figures of animals or men have never been found.

[3] Besides corn it is known that the race of Cliff-dwellers raised beans and squash; we frequently picked up stems of the latter. For domestic animals they owned turkeys.

One fact which has been investigated by that eminent archæologist, Mr. A. F. Bandelier, would seem to throw some light upon the subject. According to this authority, "it does not appear that the sedentary Indians of New Mexico ever made, within traditional and documentary times, any other than the painted pottery in greater or less degree of perfection."[2] This would prove that the specimens of indented ware which we have found cannot be less than four hundred years old; how old the painted pottery is, we know not.

The builders, — who were they, and where did they come from? Surely I would not venture to theorize from the small collection of facts which we have obtained, but I will state a few probable facts of history. From the seventh to the twelfth century the Toltecs invaded Mexico from the north; following them, came the Aztecs. It is possible that Colorado and New Mexico may have been the former dwelling-place of these migratory nations; or if they came from the northwest, straggling bands may have strolled into the lands we are describing. Yet all connection between the people of the north and those of Mexico had probably been lost long before the year 1530. It is not even probable that either knew of the existence of the other, though a belief has been current that those people worshipped Montezuma.[1] As for the state of the civilization of the ancient people, it could not have been very advanced. A community who could huddle together in such small, close, unventilated quarters, who buried their dead under their floors and under the rear of cliffs back of their mightiest houses, could not have reached a very high ideal of refinement. Yet, perhaps, we are too hasty. Perchance these remote fortresses were subjected to a long state of siege by crafty Ute or fiery Apache, wherein the heroic defenders stood out to the last; and as man after man fell at his post, his body was hastily imbedded in debris at the rear.

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[1] Hayden's Report, 1876, W. H. Holmes, p. 408.

[2] "Report on the Ruins of the Pueblo of Pecos," published in the "Papers of the Archæological Institute of America," p. 105.

Naturally this huge ruin interested us more than anything else that we met with in our trip. It deserves study by competent archæologists. Thorough and careful excavation would perhaps reveal relics which would throw light on the early history of the primitive inhabitants. It is to be hoped, however, that any work which may be done here in the future will be carried on under competent supervision, and that the walls will not be damaged in any way. With a suitable appropriation, this structure could be converted into a museum,[2] and filled with relics of the lost people, and become one of the attractions of southern Colorado.

We returned to camp at dark, and after the usual hard riding after horses, got everything to rights and whiled away the evening hours by a huge fire. Such a blaze as the juniper and piñons make, — a fire easy to build, and of lasting brilliancy!

The next morning dawned warm and bright, with a pleasant light breeze. We were up at sunrise, and off at eight o'clock. We had intended going to some cliff-houses in Navajo Cañon,[3] but our time would not allow it. Our route lay to the north, along the mesa summit, and between Cliff and Navajo Cañons, which here run nearly parallel with the main one. We passed near the ends of many tributaries of these gorges, which showed that while it was a comparatively easy matter to get out of this country to the north, to come to any given point from that direction would be impossible to any one not familiar with all the arms of the different cañons.

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[1] A belief that has been exploded by Mr. Bandelier.

[2] Possibly grander structures may yet be discovered; for the Indians tell of large cliff-houses in a cañon south of Navajo Cañon, on the west side of the Mancos River. This gorge has never been explored.

[3] Wetherill states that these structures are well built, though not very large.

We observed no traces of ancient roads on the mesa, nor of irrigating ditches; but at half-past nine we passed the ruins of what appears to have been a great reservoir. At about ten o'clock we were at the heads of Navajo and Cliff cañons, and soon we were so near the west end of the mesa that we caught a glimpse of the broad Montezuma valley. All the morning we followed trails leading through extensive forests of juniper and piñon trees, but composed of trees of small size. The piñons were loaded with nuts, which are good eating. The Indians make flour from them, on which they subsist during certain seasons. Flying about were many piñon birds. The trails were made by Indians, deer, or cattle. We caught sight of three deer in the morning; and our dog brought a wild steer to bay, which threatened at one time to run us down.

At 11.15 we reached the summit of the mesa, at a point about an hour south of the promontory which marks the entrance to Mancos Cañon. A most remarkable view was unfolded. Over the pastoral scenes of the valley of Mancos, beyond the deep cañons of the Dolores River, far away in the north, loomed the snowy crests of the San Juan Mountains, Lone Cone, and the San Miguel Mountains on the left, then the Ouray group, with the grand peak which we had climbed, flanked on the southeast by the mountains of Silverton and the needles of the Rio de las Animas. Far away in the east rose range upon range, which we could not name with certainty. In the west were the Blue Mountains of Utah, Sierra Abajo and Sierra le Sal. Beyond, to the south and southwest, stretched the great system of labyrinthine cañons to the Rio San Juan, and far beyond were the Carisso Mountains of New Mexico.

Resting on this summit during the mid-day hours, it was interesting to recall many incidents of our trip, and to return to a discussion of the former population. Something we had just observed, helped us to a theory. Looking over the wide stretch of country, we recalled the fact that to the early explorers this land seemed a desert. Over the wide, arid plains stretch miles of waste acres, covered with sage-brush and grease-wood. Yet all along the tops of the great mesa, over which we had been riding, pottery is strewn, and signs of a primitive race are found. Their numbers must have been large, or the period of their stay prolonged. Perhaps it may be necessary to suppose some change of climate, to conceive how such a population could have supported themselves by agricultural employment. What the farmers of Mancos and Montezuma valleys are doing, shows what the lowlands are capable of producing with irrigation; but we find no vestiges of ditches on the mesa, and there is not much water to turn into such channels if they did exist. Yet, beside such forests of cedar and piñon as thrive here, grass grows enough to support much game and many cattle; and the time may come when the land, grasped by the oncoming mightier race, will be overturned and tilled, and all along the broad table-land we shall see the tasselled maize bend, and fields of wheat move to the breeze. Then we shall not be surprised when we read that the country once supported a great population, of a people well advanced in many arts, and who conceived of certain forms of beauty, even though they had not the ability to give their ideas expression. Meanwhile, may we not imagine them a race who loved peace rather than war, but, hard-pressed by a savage foe, fought stubbornly and long, and died rather than desert their romantic fortresses among the cañon cliffs?

Canoeing on the Penobscot.

By Miss M. E. Hardwick and Miss E. L. Sampson.

Read October 9, 1889.

A party of three Appalachians, consisting of an Old Camper, a Younger Camper, and a Novice, left Boston July 31, 1889, for a four weeks' camping-trip in the woods of Maine. The route to be taken embraced the whole length of Moosehead Lake by steamer, and followed in canoes down the West Branch of the Penobscot, with its attendant lakes and ponds, to Oldtown, on the main river, twelve miles above Bangor. Visions of rapids, deer, bear, moose, camp-fires, and even wild-cats were dancing before the eyes of the Novice as the train bore the party from Bangor to Greenville. Here they took steamer for the Mt. Kineo House, where they were met by the guides with their canoes. The night was spent at Kineo. The next morning camping-suits were donned, packs made up, a steam-launch chartered, and the party continued their sail across the lake to the Northeast Carry, where they bade good-by to civilization. The canoes and luggage were loaded on a wagon and taken across the carry to the West Branch of the Penobscot.

And now the Novice felt as if the fun had really begun. Her canoe, which rejoiced in the impressive title, "Queen of the Wave," held, by actual count, three wooden buckets containing canned goods, tea and coffee, flour, sugar, pork, butter, potatoes, onions and maple sugar; two long rubber bags in which clothing and bedding were packed, a large canvas bag holding the tent and fly, a leather satchel, a tin baker, axe, and other small things too numerous to mention. The Novice was seated in the bow on an apple-green canoe-seat, which was a wooden chair without legs, the back braced against a thwart. Her guide, Francis Socklexis, sat in the stern. Francis was an Oldtown Indian, never speaking in English unless spoken to, but with an instantaneous grin overspreading his countenance whenever he was looked at. The Novice, when tired and cramped with hours of paddling in still water, would amuse herself by looking around at Francis at intervals to see him grin.

The Younger Camper was in Tom Dana's canoe. Tom was another Oldtown Indian, rather good-looking, a good boatman and hunter, and a great talker. He was the cook and chief guide. The Old Camper went with Smith,—a white man and genuine Down-Easter with a Yankee twang in his speech; a good-natured, obliging fellow, who kept us well supplied with firewood and original specimens of the Queen's English. The Indians spoke fair English; though they could not pronounce *th*, usually left out connectives, and made no use of the articles. The canoes were of canvas, which in these waters has superseded birch almost entirely. They drew from four to five inches of water, and weighed about sixty-five pounds.

The three boats, now keeping abreast, now following in single line, turned off from the direct route toward Lobster Lake, which lies at the head of Lobster Stream, about three miles from the West Branch. It is irregular in outline, abounding in long wooded points, sandy beaches, numerous rocky islands, and quiet coves where the pink water-lily grows in great profusion. There is a fine view of Ktaadn from its foot, and Spencer is in full view at the head.

We camped at the northern end near a high wooded bluff, making an entirely new camp. An ideal camp-ground combines a good landing, a pleasant outlook, proximity to hunting and fishing grounds, a cold spring, trees suitable for firewood, and balsams for boughs. A fitting spot being selected (with nearly all these requisites), the work of making a camp in the wilderness was begun. In two hours' time a grand transformation had been wrought. The tents were pitched and bedded, a dining-table made and overspread with the fly, a path cut to the shore, and a fire brightly blazing. The weather during our stay was warm and pleasant. In the early morning and at dusk we could see deer browsing and gambolling along the shore in full view of the camp.

The most exciting episode at Lobster occurred on Sunday. We were just finishing our dinner (which by the way consisted of chicken soup, white bread and Johnny-cake, sweet corn, French fried potatoes, Ripogenus cake, apricots, and coffee), when Tom's quick vision spied swimming toward us three black specks which he thought were loons; but he had no sooner given the loon-call than he declared them to be deer. They were headed directly for our camp. Crouching down to avoid observation, we watched their approach with bated breath. On they came, regardless of our tents and canoes upturned on the shore. We could see their ears first, and then their pretty heads. They struck bottom before they perceived the camp. They were now well out of water, and in a few bounds could have gained the shelter of the woods. The leader paused and threw up his head, sniffing danger in the air. The men could be restrained no longer. They gave vent to a series of yells and whoops which sent the graceful creatures bounding through the water in long leaps. They never stopped till they reached the opposite shore.

The next morning, we left Deer Chase Camp and set our faces toward the West Branch. The day was favorable for travelling, the sun being overcast. There is little variety in the scenery of the upper Penobscot. For mile after mile the banks are bordered with spiring evergreens intermixed with birch and poplar, growing close to the water's edge. Kingfishers and an occasional duck flew ahead of us. Once we started an owl which flew heavily across the stream, and several times a blue heron. The monotony was sometimes varied by rapids in the river. The most considerable rapid is Pine Stream Falls, where the water was very strong, boiling and surging around the rocks above and below the surface. The guides stood in the stern, setting-pole in hand, dexterously avoiding the rocks, and shoving the canoes with swift impetus through the foaming eddies. Here Smith cracked his setting-pole.

We soon came out into Chesuncook Lake, which is twenty miles long but comparatively narrow. There is not an island in it. It is rather monotonous, except that it affords a good view of Ktaadn. We stopped at Chesuncook Farm to buy some milk and half a lamb. The lambs were driven up for our inspection, and we were asked to select one. To the Old Camper was left this delicate task; and whether he judged by the texture of the wool or the color of the eyes, he certainly showed good judgment, as the lamb proved very tender.

The clouds looked lowering, but it seemed best to push on as far as we could lest the wind should blow on the morrow and delay our journey. It is not uncommon for experienced boatmen to be wind-bound several days on large lakes. The rain now began to fall. Tom landed several times to explore for camping-places before he found one to his mind, and when we landed it was with the prospect of a damp bed and a cold supper. It seemed a hopeless task to make a camp in that dripping forest; but the guides soon had a good fire going, and the tents were pitched and bedded down, the fly and rubber blankets being spread over the wet boughs. After supper we sat under our sheltering roof and listened to a bear story Tom told while the rain pattered on the tent, the wind made a great rustling in the trees, and the firelight danced and flickered over the faces watching it. This is Tom's story: "In farm-house — up there, West Branch — bear go in pantry — climbed in window — eat all he want — smash dishes — man he in next room talking all while — hear nothing — go in pantry — bear been there — go watch — bear come back little while — want some more — man shoot him through window — true story." All Tom's stories were true.

The next day we resumed our journey down Chesuncook Lake, crossed Chesuncook Carry; and when the afternoon was well spent launched on Ripogenus Lake, which lay fair and tranquil in the sunset light. We remained here several days, taking side trips to various points.

The next stage of our pilgrimage was the most arduous for the guides. It was the crossing of Ripogenus Carry, three miles in length, where boats and camp equipage had to be lugged over. It required two days. The first day each guide took over a load in the morning and another after dinner, making six in all. While they were thus engaged, we employed the time in exploring Ripogenus Gorge. Immediately on issuing from Ripogenus Lake, the Penobscot takes on a wild and picturesque character. High on either side of a foaming, rushing torrent rise perpendicular cliffs to the height of sixty or seventy feet, making a gorge a mile and a half in length. An occasional tree grows out of its rocky walls, and tufts of harebells are found in every crevice. The color of the hurrying waters changes in the sunlight with beautiful gradation of tint from a pale amber to a decided black. At the lower end of the gorge are two large rock islands, about half a mile apart, called respectively the Little and Big Heater from their fancied resemblance to a flat-iron. They are as high and precipitous as the cliffs on either shore, and support a vegetable growth of bushes and even trees. Beyond this point the river widens and the banks are lower. Doubtless the time will come when the wild beauty of this chasm will attract lovers of Nature until it becomes a favorite place of resort.

The next morning we were up at 5.30, Tom being a firm believer in an early start. The guides crossed the carry twice, as the day before. The rest of us took over some of the lighter things, as satchels, rods, lanterns, and guns. The road was hilly and moist in spots. It crossed numerous cold brooks, over which rough corduroy had been flung. The latter part of the carry is identical with the river-drivers' path. It is narrow and thickly strewn with rocks which pinch the toes of the unwary. Sometimes it led through bracken as high as our heads and tall white flowers or goldenrod. Now and then sweet odors came from some low-growing shrub. At times the sun pierced the clouds, when flickering light and shade gave a new charm to the forest we were threading. Once we diverged from the carry-path to visit the Arches, another picturesque point on the river. Our camp was made that night at the Big Eddy, where was a level spot overgrown with grass which we found to our sorrow harbored mosquitoes and midges. At this point the river makes a bold curve. Across the basin loomed the crest of Ktaadn, — a nearer and grimmer view than we had had before. Just before dark the guides arrived on their final trip, canoes on head.

The first sound we heard next morning was Tom shouting, "All aboard!" at the door of our tent. The sky was cloudy, although the sun shone at intervals. The river was interesting from the start. Quick water alternated with smooth. Maples with a dash of autumn coloring, silver birches, and an occasional beech and ash lined the shores and were reflected as in a mirror from the clear depths below. Soon we came to a rocky pitch not usually run, which Tom determined to take us over. He tried several places before he could find a channel, but at last went down in the roughest part of all, almost grazing the rocks, while the waters surged angrily against the light craft. Tom looked pale, Indian though he is, after the violent exertion. He and the Younger Camper waited in the smooth water at the foot to see the others come down. The canoe containing the Novice swept along around and between rocks, and finally plunged down into the foaming, boiling water on a sharp rock; but just as the Novice, throwing off her rubber cloak and seizing the sides of the canoe, was preparing to jump for her life, the counter current that a special providence to canoeists has placed around rocks in rapids, swept the canoe to one side, and the Novice breathed again. Tom usually went ahead to pick out a channel, and the others followed in his wake. Running some strong rapids, we came to the carry around Ambajamackomas Falls. When we launched again, it was at the head of the "dread Horserace," — a stretch two miles in length, abounding in rocks, some out of the water and others below the surface, with rapids boiling and surging from shore to shore. We had scarcely started on the perilous run, when Smith called to the others to hold up. His setting-pole, cracked at Pine Stream, had snapped in two. We pulled for the shore, where Smith cut and peeled a young spruce, while Francis burned out the iron socket of the old pole. Making the new pole delayed us half an hour. Meantime a black cloud had gathered and thunder began to mutter; but there was nothing to do but go on, which we did with thunder and lightning accompaniment, and raindrops hissing in the water on every side. Finally the shower struck us with such fury that we were glad to take advantage of a lull in the current, and wait by the bank till its force was spent. The rain came down in sheets, accompanied by hail, which mercilessly pelted our unprotected heads. The first shock of the down-pour penetrated our waterproof garments, by courtesy so called. When the rain held up a little, we went on again. No use could be made of umbrellas, as they would have obstructed the boatmen's view.

It was marvellous, the skill with which they picked their way where instantaneous decision was required. We could scarcely see the rocks before the rain; with the water blistered with pattering drops, it was impossible for an inexperienced eye to distinguish them; yet we seldom grazed one, and the Indians hardly took in a spoonful of water, though in our drenched condition that mattered little. Sometimes one canoe would be ahead, and sometimes another. When a good opportunity offered, we "stood not on the order of our going, but went at once." Every man for himself was the only rule we could follow. Early in the run, Smith's new pole caught in a crevice on the ledgy bottom, throwing him backward; at the same time his paddle fell overboard. The Old Camper seized the spare one, and kept the boat straight till Smith could recover his balance and extricate the pole, the end of which had been badly twisted. He chopped off the socket in the unsteady boat, having thenceforth nothing but the paddle and the "barefooted" pole to depend upon; in spite of this serious disadvantage, he managed to get through without accident, though he shipped considerable water. Sometimes the canoe seemed a thing alive, as she trembled from stem to stern under the quick, strong strokes of the paddle. As a rule, we went down where the surges were highest, the safest place being that of the greatest apparent danger. Clouds kept gathering and breaking, though none of the showers were so severe as the first. Drawing a long breath at the end of the Horse-race, we came out into a peaceful, lake-like expanse, deserving a more fitting name than Sourdnahunk Dead Water. Crossing another carry, a stretch of tranquil water brought us to a point where two streams make in close together, called Aboljackarmegus and Aboljackarmegassic, which the guides more familiarly term Abol and Sandy. This was our destination, and here we made our camp in full view of Ktaadn. That night, we lingered later than usual over the fire before seeking the luxurious couch Smith had prepared for us, while Tom related his army adventures and gave his experiences on the "buskined stage." Glancing riverward, we could see the truncated cone of Ktaadn, "the greatest mountain," reflected on the moonlit stream. As we sat before the blazing logs, dry and happy, our experience on the Horse-race seemed like a moist dream.

We stayed a week at Abol, seeing deer every day, often just across the river from the camp, and once we caught sight of a bear. Chub came in shoals to the landing for our refuse food. They were so voracious that, by baiting them with a bit of meat tied to a string, they could be easily landed on the bank. After a few days they became so tame that they actually fed from our hands.

The event of our stay here was the ascent of Ktaadn by way of the South Slide. The mountain is nine or ten miles from the river at this point. It is usual to start in the afternoon, and camp one night at the foot of the slide. Accordingly, on Tuesday, the 13th of August, we started after an early dinner. Smith and Francis accompanied us, taking tents, blankets, and a day's supply of food. It was a bright sunny day, with a northwest wind. The canoes were pushed as far as possible up Sandy Stream. When it became too shallow for navigation, we waded, having worn rubber boots for the purpose, leaving the canoes drawn up on the grass till our return. At the entrance to the path we left our rubber boots hung up on trees. The path was quite well defined, though blind in places. Once we saw a tawny spotted snake which Tom said afterward was a stone adder. Francis struck at him with a hatchet. He glided out of sight, darting out his tongue at us in a vicious way. We crossed Sandy Stream twice, and fourteen other brooks, all fed from Ktaadn. Francis cut fresh blazes as we passed along. In places the forest was beautifully mossy; logs, rocks, and fallen trees being covered with a green carpet. Leaving behind a swampy jungle where were numerous blow-downs, we came to a convenient spot for camping, a mile or so below the Slide. Here packs were thrown off, tents pitched, and a rousing fire made. A cold brook leaped down the mountain side close by. The night was cold; the wind had a sharp edge. The moon shone brightly. It was no hardship to rise early the next morning; we had slept too cold to have any desire for a morning nap. The sky was clouded, the outlook for a favorable day not good; still the clouds were shifting, and we hoped for the best. We started up the mountain at 6.30, each of the guides taking a pack, containing wraps and provisions for a lunch on the summit. Smith caught a glimpse of a deer in the forest. Indications of moose and caribou as well as deer were frequent. Our course was marked to the foot of the Slide by occasional chips of granite placed on the larger rocks. Once in the Slide, there was no mistaking the way. It was up and up at an angle of forty degrees. The footing was uncertain. The rocks being easily dislodged, great care was necessary to avoid sending down an avalanche on those below. One advantage of the broad, desolate track was the fact that it admitted of fine views all the way up. Many bodies of water were visible, — Millinockett with its hundred islands, the winding course of the West Branch, Ripogenus, and the lower lakes in a vast green forest on which the devastation of lumbermen, and the voracious maw of the saw-mill seemed to have made no impression. Spencer and Lobster Mountains, and the Jo Merry Range could be clearly distinguished. The more distant mountains on the horizon line were indistinct. In all this vast extent of territory no human habitation could be seen save our little camp by the river-side, far, far below, with a faint line of smoke curling lazily up. As we looked, we heard the distant report of two guns, which we knew must have been fired by Tom, who had been left behind. Two thirds up was a green island in the Slide, which we had noticed from the river. The growth was mostly of alder bushes, through which it was rather difficult to force a passage. Many of the granite rocks were disintegrating. It was easy to see the process of soil-making. We were glad to leave the Slide behind and take to the rocks, though climbing them was no child's play, — so huge were they, and pitched together in such a chaotic mass. None of us were sorry to reach the table-land, which we did at 9.30. The hard work of the ascent was now over. It was still a mile to the summit; but most of the way was level, and the rest a gradual slope. We accomplished it in half an hour. There are a thousand acres of table-land on the top of Ktaadn. Though rock-strewn, it is overgrown with moss and low blueberry bushes. There were living springs on it, from which Smith filled a coffee-pot to take to the summit. He found here two caribou horns, which, however, were not mates. On the summit were two cairns built of stones. Inside of one we found a tin can containing records of previous parties; among others, that of the Appalachian party of 1887. The tin cones which had been affixed to the cairns were so rusted that they no longer served as reflectors. Ktaadn is not a mountain one could feel any affection for; it is too stern and forbidding. It seemed to frown upon us, mites as we were upon its hard, unresponsive bosom. No wonder that the simple-minded Indian believed that Pamola was angry with those who climbed to the top of Ktaadn.

The Western Peak is the highest. About fifteen minutes' walk over the ridge beyond brought us to the grim East Peak, from which we could view the precipitous Narrows and the fantastic shapes of the Chimney and Pamola, the remembrance of which is sufficient to arouse feelings of awe. These peaks, taken together, form a vast semicircle with steep and rugged sides, enclosing the South Basin. At the bottom of the Basin we could see a small black pond, still and lonely, as befitted its grewsome surroundings, and could just make out on the opposite shore the A. M. C. hut, familiar to many of the Club. Besides the lakes already named there could be seen Moosehead, Roach, Chesuncook, Chamberlain, and Eagle, with numerous others. What was lost in distant views was perhaps made up in a peculiar cloud effect which was most interesting. The clouds were rolled together around and above the horizon like a vast drop-curtain with a white edge. Below it gleamed lakes, ponds, and rivers; and to the east the town of Pattin, with its scattered hillside farms, was illuminated with a soft mellow glow. The mists coming nearer and threatening to shut us in altogether, it seemed the part of prudence to begin the descent, and we started down soon after eleven o'clock. Under the great drop-curtain the light grew more weird and unearthly, like "the light that never was on sea or land." The descent at first took as much time as the ascent,—on the rocks on account of the space between one possible foothold and the next, and on the upper Slide by reason of the care necessary not to roll down loose stones. At four in the afternoon we reached Sandy and our rubber boots. Tom was awaiting us at the home camp. The guns we had heard he had fired at a gull, whose snowy plumage was then drying on a board. As if Pamola really resented this visit to Ktaadn, as we looked across through the twilight at the mountain looming dimly before us, all we could see was the deep scar of the South Slide, the rest being hidden by angry black clouds. The south side of the mountain offers a harder and less interesting way of ascending Ktaadn than the north side. From the south it presents a long steep wall, broken and scarred by slides and ravines. The latter do not open a way up, as they are filled with impassable bowlders. The spaces between the ravines and slides being covered with the worst kind of scrub, there is no way left for the mountain-climber except the slides. The Basin and wonderful formation of the mountain are not seen except from the summit, and from there its grandeur and impressiveness cannot be fully appreciated.

Our next sojourn was at Pockwockamus Still Water, — an expansion in the river about three miles long, dotted with numerous green, wooded islands, and affording a fine view of Ktaadn and its subordinate peaks.

The beauty of the lower lakes through which our course lay was marred by flowage. Shad Pond is the last considerable bulge in the West Branch. A mile or two above are the Grand Falls of the Penobscot. From twelve to fifteen feet high they cross the river obliquely, falling over ledges of varying heights with a great rush and roar. On each side is a series of high slaty cliffs, isolated from one another by little coves and crowned by one or two tall pines.

Between Shad Pond and the main Penobscot lie ten miles of rapid water, the different pitches being variously designated. These being safely passed, our route led through more civilized scenes, the main river being settled at intervals on both shores. Our ears became gradually accustomed to the rumbling of trains, the bleating of sheep, and the tinkling of cow-bells. Reaching Oldtown, the air was pierced with the shrill screeching of the steam saw-mills, the much-enduring logs sending forth a last despairing shriek as they were mercilessly sawn asunder.

In the trip thus briefly outlined, we travelled two hundred miles in canoes, visited twenty lakes and ponds, made twelve different camps, and saw thirty-seven deer.

Chaucer's Love of Nature; its Reproduction in American Poetry.

By H. W. Whittemore.

Read July 3, 1889.

There is at least one thing about Chaucer that nobody can overlook; that is, he is a genuine lover of Nature. The more he is read the more plainly this stands out, and the more evident it becomes at the same time that he always looks at Nature from a cheerful standpoint. What he says of himself in the "Legende of Goode Women" is quite to the point,—

"On bokes for to rede I me delyte,
And to hem give I feyth and ful credence,
And in myn herte have hem in reverence
So hertely that there is game noon
That fro my bokes maketh me to goon,
But it be seldom on the holy day,
Save certainly whan that the monethe of May
Is comen, and that I here the foules synge,
And that the floures gynnen for to sprynge,—
Fairewel my boke and my devocioun!"

A great lover of books he would have us believe him to be,—a very bookworm in fact,—but only until the month of May has come.

But Chaucer is not content with generalities. Hear what he says of the daisy,—

"Of all the floures in the mede
Thanne love I most these floures white and rede
Suche as men callen daysyes in her toune."

In the early morning he is out "walkyng in the mede" to see "this floure agein the sonne sprede." He leaves it at nightfall only when it has begun to "close and goon to reste," and he even dreams about the daisy. So much is said that we begin to think him no better than the common voluble sunset enthusiast.

But after all we judge Chaucer, not so much by his professions, as by the unpremeditated words that come direct from the heart. The real spirit of our poet reveals itself most happily in a word or two here and there, an unexpected turn, a quaint phrase beyond imitation.

It is worth noting here that in his treatment of Nature he is fortunate enough to escape such critics as Lessing and Matthew Arnold. He uses her to give variety, as a background. He does not depend upon clouds and sunsets after the manner of Shelley, who "failed to lay hold upon the poet's right subject-matter," Arnold says. "Actions," says Lessing, "are the peculiar subjects of poetry;" and nobody objects. But it is worth a great deal to a poet to be able not only to point out to us one by one the pilgrims toiling along the road, but to show us at the same time the roadside trees and flowers, the green fields, and mountains beyond. This cannot be done by any who take a make-believe interest in Nature because it seems to be the thing to do. It can be done only by those who are enough like Chaucer to be light-hearted and glad in June sunshine; and among these some of our American poets can safely be ranked.

Nature pure and simple is within easy reach in this country, and nearly all our poets can on occasion make use of the mountains or the sea. Those who in the special field of Chaucer are good but do not quite belong with the best, are by far the most numerous. Longfellow is one of these. He prefers the sea, and can say his best word for Nature on the sea-shore. He can indeed easily say graceful things of the country in a flower-garden sort of way; but on the whole his Nature reminds me of Tennyson's, — there is enough of it, but it is too carefully trimmed. His brooks chatter along very delightfully, but we have a feeling that an engine out of sight somewhere is pumping up the water.

Whittier, on the contrary, is not artificial in the least degree. We cannot doubt that, attuned to Nature's melodies, he loves

> "The bird's song in his dooryard trees,
> And the low hum of home-returning bees."

No make-believe lover of Nature would have noticed, as he did, that

> "Along the roadside, like the flowers of gold
> That tawny Incas for their gardens wrought,
> Heavy with sunshine droops the golden-rod."

There is a vein of Chaucer in Whittier, but it is not the most prominent one. At times he feels the "gladness of Nature," and can say with Bryant, —

> "There are notes of joy from the hangbird and wren,
> And the gossip of swallows through all the sky.
> The ground-squirrel gayly chirps by his den,
> And the wilding bee hums merrily by."

But more often both Bryant and Whittier feel with Wordsworth, —

> "A sense sublime
> Of something far more deeply interfused,
> Whose dwelling is the light of setting suns,
> And the round ocean and the living air,
> And the blue sky and in the mind of man."

But this is not Chaucer, nor is it interpreting Nature, either, in any proper sense. What she seems to speak to the poet he was just on the point of saying to himself. To the poet Nature is mainly *suggestive.* Tyndall goes to Emerson, and gets an impetus such as the best men and books can give. He drops Emerson, and writes his best chapter on Light or Sound. Emerson, Whittier, or Bryant goes out into the woods, and comes back with his best thoughts in poetical form.

We are not confined, however, to Longfellow, Bryant, and Whittier for touches that suggest "vernal Chaucer," as Lowell calls him. Whitman deserves a place here. Those who at all times prefer a neat garden to wild disorderly woods will perhaps think Whitman's Nature needs rearranging in rows and beds; but any who have ever turned away from beds of flaming tulips to look at dandelions and green grass, will appreciate some of the things he says. See where he goes to walk in spring, —

> "Now along the pond-side, now wading in a little,
> Now by the post and rail fences where the old stones there picked from the fields have accumulated,
> Wild-flowers and vines and weeds come up through the stones and partly cover them.
> Beyond these I pass far, far into the forest before I think where I go,
> Solitary, smelling the earthy smell, stopping now and then in the silence."

Again see where he goes with his dog and gun, —

> "Alone, far in the wilds and mountains I hunt,
> Wandering amazed at my own lightness and glee,
> In the late afternoon choosing a safe spot to pass the night,
> Kindling a fire and broiling the fresh-killed game;
> Soundly falling asleep, my dog and my gun by my side."

Whitman likes to go out into the fields and woods alone, you observe. If you would apply a sure test to one of Nature's professed devotees, put him off by himself on a mountain or by a lakeside for a day or two, and see how he likes it. It is one thing to spend a delightful half-day with a picnic-party, and quite another thing to enjoy a delightful half-hour even, in the self-same grove, alone.

Whitman, like Whittier and Bryant, easily runs into a more serious treatment of Nature, not at all like Chaucer, and very much like Wordsworth; but we have at least one poet whose spirit is Chaucer's from beginning to end, and that one is Lowell. To begin with, he is a great admirer of Chaucer. He repeats to himself a thousand times, he tells us, the lines beginning, —

> "Whan that Aprille with his showres soote
> The droughte of Marche hath perced to the root,"

and every time he does so a breath of uncontaminate spring-time seems to lift the hair on his forehead.

All poets admire Chaucer, however. Many of them have faithfully copied his Nature only to leave out its real spirit. But Lowell copies nobody. It was Nature who copied when she gave to Lowell a dash of the very thing she put into Chaucer first. He lacks the striking originality of Whitman. He does not escape the conventional by seeking out the rough and wild and out-of-the-way; but he sees the commonplace, every-day beauties of the roadside, and speaks of them with a fresh simplicity as free from anything artificial and "put on" as buttercups are. Can any one doubt his sincerity when he says of the dandelion, —

> "Dear common flower, that grow'st beside the way,
> Fringing the dusty road with harmless gold,
> . . . . thou art more dear to me

Than all the prouder summer-blooms may be.

. . . .

My childhood's earliest thoughts are linked with thee;
The sight of thee calls back the robin's song,
Who, from the dark old tree
Beside the door, sang clearly all day long,
And I, secure in childish piety,
Listened as if I heard an angel sing
With news from heaven which he could bring
Fresh every day to my untainted ears
When birds and flowers and I were happy peers."

No one is more at home with a bird or a bird-song than Lowell. We can hear his bobolink gurgle in ecstasy,—

"June! dear June! Now God be praised for June."

and we can almost see the bluebird

"Shifting his load of song from post to post."

It is Lowell who said what we say after him every year,—

"And what is so rare as a day in June?"

Here, if nowhere else in American poetry, is the chord that Chaucer struck five hundred years ago.

In our day Nature is viewed from standpoints undreamed of in his. Microscopes have come, telescopes have come, laboratories have come, and with them the keen-eyed, matter-of-fact man of science; but still commonplace flowers grow in the fields and meadows as they always have grown, birds sing in the trees as cheerfully as ever, and once in a while a man is just as "glad of it" as Chaucer was.

Some Adirondack Paths.

Second Paper.[1]

By Frank W. Freeborn.

MT. MARCY (TAHAWUS).

It is a pity that this mountain, the highest of the Adirondacks, could not have kept more exclusively its significant and easily pronounced Indian name, Tahawus. Its summit, 5,344 feet high, is probably trodden by more visitors than any other in the group. Three trails lead to it, — one on the east, very blind and rarely used, up the valley of John's Brook; one on the north, from Adirondack Lodge, 7 miles away; and one on the south, from the Ausable Ponds, 7 miles distant. The last is by far the most picturesque, and is altogether the most satisfactory one for climbers from Keene Valley. While this trail is perfectly easy to follow, its lower terminus is reached only by boat; and as all the boats on the upper pond are owned by guides, a guide is necessary for the trip. Besides, the ascent from Keene Valley and return cannot be made by daylight in less than two days, except at great speed and without time to enjoy the views. If one is in camp on the upper pond, the ascent is a pleasant day's trip. If one makes the ascent of the mountain the only object of his excursion, the best plan is to go the first day as far as a little bark shelter called Bowlder Camp, near Panther Gorge, ascend Tahawus early the next morning, and on the way down lunch at the upper pond, returning to Keene Valley in the afternoon.

To reach the upper Ausable Pond, we follow the highway south from Keene Valley 3 miles, about 50 minutes, to the Beede House. From there an excellent gravel-road leads 4 miles through the forest in 55 minutes more to the boat-landing at the lower Ausable Pond. As this point is about 1,000 feet above Keene Valley, it takes the stage about as long to traverse the distance as it does a pedestrian. One needs about 30 minutes to row the length of the lower pond;

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[1] See Appalachia, vol. v. p. 222.

and then a walk of 30 minutes more along a trail, quite level but generally muddy, brings one to the upper pond. This one is about as long as the other, and along its shores are a dozen or more permanent camps belonging to the guides. They are built of logs, open on the front towards the lake, and are well provided with everything necessary to the comfort of one who loves a life in the woods. It is safe to say that no other lakes in the Adirondacks, and certainly none in New England, can equal these Ausable Ponds in combined beauty and grandeur. The lower one is rather narrower than the upper; and the mountains — Colvin on one side and Resegone on the other — rise so steep that there is absolutely no trail along their sides. The Boreas Range rises with less abruptness from the eastern shores of the upper pond, while over a receding basin on the west tower the grand, rocky giants, — the Gothics, Saddleback, Basin — and the black, sharp peak of Haystack.

To ascend Tahawus from a camp on the upper pond we go by boat up the winding stream, or rather still-water, which feeds the lake to a little bay called "Cold Slough." This requires about 30 minutes. Here the trail begins. For the first six or seven minutes it crosses a very wet, spongy bog, and then climbs gradually up a long ridge called Mt. Bartlett, which reaches out as a southern spur from Haystack. In 25 minutes from the boat we pass a path diverging to the left at an obtuse angle. In 45 minutes more the trail skirts a high, sandy bank called Lookout Point. Below is Marcy Brook noisily tumbling over its rocky bed. Across the ravine rises the gray dome of Skylight, nearly 5,000 feet high, and looking up the valley we get our first view of the gray cone of Tahawus.

At this point we have ascended about 1,000 feet since leaving the boat. The path, which is at present blocked by many windfalls, becomes a little steeper, and brings us in 40 minutes more to the crossing of Marcy Brook. In 10 minutes more we find a trail diverging to the right. This leads in 5 minutes of gentle descent to Bowlder Camp, mentioned above. It is built near the south end of Panther Gorge in front of a large rock, and with a fire is warm enough without blankets. In 1887 it was just big enough for three persons, in 1888 it had been doubled in size, but in 1889 it had again been reduced to its former dimensions. Even if one is not intending to spend the night here, it is worth while to make this detour from the main trail for the sake of the view obtained from the middle of Marcy Brook near by. The dark precipices of Haystack and Little Haystack rise close at hand on the east, the lower shoulders of Marcy on the north, and the bowlder-covered dome of Skylight on the west.

Resuming the main path, it becomes very steep and quite wet. It lies on the side of Skylight, and brings one in 40 minutes to the col between Skylight and Marcy. Here is an excellent spring, and close by lie the scanty remains of what was formerly called Summit Camp. The neighborhood has been denuded of low balsams. A few rods west, on the trail leading down to Lake Colden, lies a broad shallow pool called Lake Tear of the Clouds, the highest sources of the Hudson. The waters of the spring at Summit Camp find their way into the St. Lawrence through Lake Champlain.

Passing to the left of the rock behind the camp, the trail up Tahawus enters a low growth of balsams. It is very wet, and brings us in 25 minutes to the open ledges. Beyond this there is no indication of a trail, but it is best to keep directly over a knoll, seen on the right as we emerge from the trees, and to note the same knoll in returning in order to find the path in the scrub. After passing this knoll we push directly for the summit. It takes us about 15 minutes to go from the scrub to the top. There is a large, very cold spring a few rods northwest of the summit.

The general grouping of the mountains at the west is very much the same as when seen from the Gothics. To the east and south it is somewhat different. Below us is the narrow Panther Gorge between us and the steep, dark crags of Haystack. Southward stretches the valley of Marcy Brook, between Bartlett Ridge and Skylight. The Ausable Ponds are out of sight. Elk Lake appears beyond the Boreas Range just at the right of Haystack, and over this lake lies the beautifully formed Blue Ridge. Directly over Haystack, with their summits almost in line, appear Colvin, Nippletop, and Dix. A little to the left of Haystack and just beyond it lies the rugged head of Basin, and in the same direction the long ridge of Saddleback, the Gothics and Wolfjaws, with the Giant twice as far away. The rounded knoll of Hopkins Peak is just at the left, and still farther to the left the eye follows down the immense trough of John's Brook across the Keene Valley to Baxter and Hurricane. Porter shows its long ridge with the little summit near its western end, and just this side of it rises the ridge of Slide. Seventeen miles north, Whiteface rears its graceful peak over Mirror Lake and Lake Placid.

In descending, we reach Summit Camp in 25 minutes, cross Marcy Brook in 40 more, and in 20 more stand at Lookout Point. From there to "Cold Slough" is just 1 hour. The ascent from "Cold Slough" occupies 3 hours 20 minutes, the descent 2 hours 25 minutes. I give the mean time registered on three visits, accompanied each time by a single companion and a guide nearly all the way.

MT. HAYSTACK.

This mountain is 5,006 feet high, and is ascended by few persons. The principal interest in the view is the basin between Skylight, Haystack, and Marcy; Panther Gorge between Haystack and Marcy; and the commanding figure of Tahawus itself close at hand.

The route at first is the same as that towards Marcy; but 25 minutes after passing Lookout Point we turn to the right into an old trail running north to Panther Gorge. This is so little used that we could not have followed it without a guide save with great loss of time. In 15 minutes we turned at a sharp angle to the right into the Bartlett trail, which we followed about southeast for 15 minutes; this brought us to the top of Bartlett Ridge just where the steep ridge of Haystack rises from it. Here near a large bowlder is a small pool of water, probably the highest to be found on this mountain in ordinary weather. From this point the trail up Haystack is very steep and quite plain, though but little used. In 40 minutes of climbing, we reach the tree-line. There are no path-marks on the cliffs and ledges, which it takes about 15 minutes to traverse. On the east and west the mountain is so steep as to be quite inaccessible, and we could almost throw a stone into the bottom of the basin on the west 2,000 feet below.

In descending we reached the bowlder on Bartlett Ridge in 30 minutes. We had left camp in the morning at 6.50, and as it was now only 11.40, we decided that instead of returning as we came we would ascend Marcy too. Accordingly from the bowlder we followed the Bartlett trail towards the northwest, and reached Gorge Brook a little way above its junction with Marcy Brook at just noon. I take these names from Colvin's map; the guide called the former Marcy Brook, and the latter above the junction, Skylight Brook. Here we stayed 25 minutes to lunch. We crossed the brook at this point, and following the trail around to the left for 5 minutes, crossed Marcy Brook close by Bowlder Camp. Following from this point the route described in the previous section, we reached the summit of Tahawus at 1.50. It seemed hardly possible that we had stood so recently upon the grim peak which faced us across the deep valley.

Our return to camp was made according to the schedule for the descent of Mt. Marcy. We reached camp at 5.35, well satisfied at having accomplished with much less difficulty than seemed possible, a trip that we had supposed would require two days.

MT. DIX.

Though this mountain is only about 400 feet higher than the Giant, its base is so much more distant and difficult of access from Keene Valley that it is not advisable to attempt to go to the top and back in one day on that side. My companion and I with our guide went the first day over the Ausable Ponds, and up the inlet as far as possible. From there we crossed the Boreas Range by a low pass, and finding a boat at the northwest inlet of Elk Lake, rowed to the Elk Lake House, a log-cabin at the southern end of the lake. This lake lies in a broad forest basin south of Nippletop and Dix, and elevated about 1,981 feet above the sea.

In the morning our host set us ashore at the northeast inlet of the lake, from which point he had recently cleared the trail up the mountain. For the first 30 minutes after landing, we follow a nearly level logging-road until, after crossing a dam and bridge, we reach a fork in the road. Taking the right-hand fork, we follow it 30 minutes more with rather more decided ascent and reach the trail proper, the entrance to which is newly and plainly blazed. The trail descends at once to the left into the deep, picturesque ravine of McComb Brook, and after a steep climb of about 10 minutes on the other side reaches a spring, — the last chance to drink on this side of the mountain. One needs a canteen to make this ascent with comfort. From this point to the summit requires 1 hour 50 minutes of pretty steady climbing. The trail is easily followed, and leads up the steep, forest-covered shoulders of the mountain. We do not emerge from the woods until very near the top. The summit is a bare ridge, running north and south, with the highest point just north of the middle. To the east and north our view was cut off by the thick clouds gathering and surging up from below; in a few minutes after our arrival that to the northwest was similarly obscured; but in the south and southwest the bright sun lighted up the wild basin bounded by McComb on the left and Nippletop and the Boreas Range on the right, in which the only sign of habitation was the Elk Lake House, about 5 miles away as the crow flies.

On leaving the summit we keep along the ridge to the northwest, and in 10 minutes enter a tract of low balsams. It is difficult there to find the trail, as the blazes are very old, some of the trees blown down, and the ground so covered with rank weeds that no traces of predecessors can be seen. The trail 10 minutes farther on becomes a little clearer, but the descent very abrupt, bearing to the right towards a slide, the left edge of which we reach near its lower end in about 1 hour after leaving the summit. Here on the slide itself we find the first water on this side of the mountain. After lunching beside this pool, we cross the lower end of the slide, and descending as rapidly as the fragmentary condition of the trail-marks will allow, we reach in 25 minutes a fork in the path plainly marked with large blazes and some faint, but still legible, pencilled directions. The right fork is the old trail, which keeps straight on across the basin and around the east side of Noonmark. The other — a shorter, newer trail — turns sharply to the left, and crosses the ridge which connects Nippletop, Dial, and Noonmark. We keep to the left. Even here the trail disappears at times, and we have to search carefully to find it. In 1 hour and 10 minutes of moderate ascent, we reach the top of the forest-covered ridge. In descending it the trail bears well off to the right, and in 1 hour of gentle descent brings us into the Ausable Ponds road close to the western end of a small clearing just inside the gate of the Adirondack Mountain Reserve.

The time occupied in the ascent from Elk Lake, exclusive of that wasted in hunting for the proper path, was 3 hours. It took us 3 hours and 35 minutes, exclusive of the halt for lunch, to go from the summit to the end of the trail in the road. Taking into account the character of the ground and the trail, it would probably require to go over the route in the opposite direction 1 hour and 20 minutes from the pond road to the top of the ridge, 50 minutes more to reach the junction with the old trail, 35 to the foot of the slide, and 1 hour 35 minutes from there to the summit of Dix, or 5 hours 10 minutes in all. The starting-point in the road is about 3 miles from Keene Valley. The descent on the southern side would require about 1 hour to reach the point where the trail emerges into the logging-road near the ravine of McComb Brook; 50 minutes more would bring one to the shore of Elk Lake at East Inlet; but as no boat could be found there except by previous arrangement, one would have to skirt the lake on the east for about two miles to reach Elk Lake House.

MT. PORTER.

This is a ridge two or three miles long. Its highest point, which is near the western end, is so covered by woods and scrub that, as I am told by a guide, no view can be found there sufficiently clear to pay for the labor of reaching it. The eastern end is conspicuous by its steep, rocky face, rising to the height of about 3,700 feet just northwest of the village of Keene Valley, and though the view includes only about 180 degrees of circuit, it is well worth a long climb to reach. The trail ascends through a hollow in the mountain just opposite Mt. Baxter, and for the careful selection of the grade and the abundance of blazes is the best I know in the Adirondacks.

Perhaps the best way to reach the trail is to turn in from the highway at the second house on the left beyond Brook Knoll Lodge, a good 2 miles north of the village. Crossing a field and a little brook, we turn to the left and keep around the base of a low hill on our right. Passing through a small, boggy thicket, we come into a glade bounded on the east by steep cliffs. At the southwest corner of the glade, on the edge of the woods near the brook, is the foot of the trail marked by very large blazes. It takes about 15 minutes to reach this point from the road.

The trail is so little trodden that we must keep the blazes in sight. We ascend for the first 13 minutes along the left bank of the brook. Here we cross it, and soon bear away from it to the left. The trail forks 28 minutes after crossing the brook, and we take the left. The grade becomes steeper, and in 25 minutes more we reach a small, clear spring about 8 feet to the left of the trail, — the last water. After 32 minutes more of rather steeper climbing, we emerge upon a platform of rock facing the south.

Just below us stretches the valley of John's Brook, at the head of which rises Marcy with the steep escarpments of Panther Gorge on its left. In order from the right lie Skylight, Little Haystack, Haystack, Basin, — with its summit appearing from this point like the crest of a breaking wave, — Saddleback, and the bare, broad face of the Gothics. Wolfjaws terminates the nearer range. Beyond the latter rises Nippletop, followed on the left by Dial, Dix, and Noonmark. Then just over Keene Valley stands the Giant, presenting a much more beautiful form than from any other point. Seen from the valley its proportions are partly hidden by the nearer low hills, and even from the head of the valley it looks depressed and broad and bulky. But from this platform the lower hills are flattened out of sight against its sides, and it appears to rise directly from the bottom of the valley. From other points its top looks blunt, from here it is gracefully conical. Hopkins Peak is almost lost against its background, the Giant. Next comes Baxter with its triple summit, and then Hurricane, the last mountain in view on the left before the prospect is cut off by the woods on the ridge behind us. Over Baxter appears the low country about Elizabethtown, with Raven Hill just beyond it. This cliff on Porter where we are standing is the only easily accessible point from which to get a near view of the northern side of the Marcy Range.

As it was late in the afternoon when I began the descent, and as I was making the trip alone, the gathering dusk warned me to quicken my pace. I reached the little spring in 17 minutes, crossed the brook in 23 more; 8 minutes farther on came to the end of the trail, and in 12 more reached the highway. My ascent from the road had occupied 1 hour 53 minutes, my descent to the same point just 1 hour.

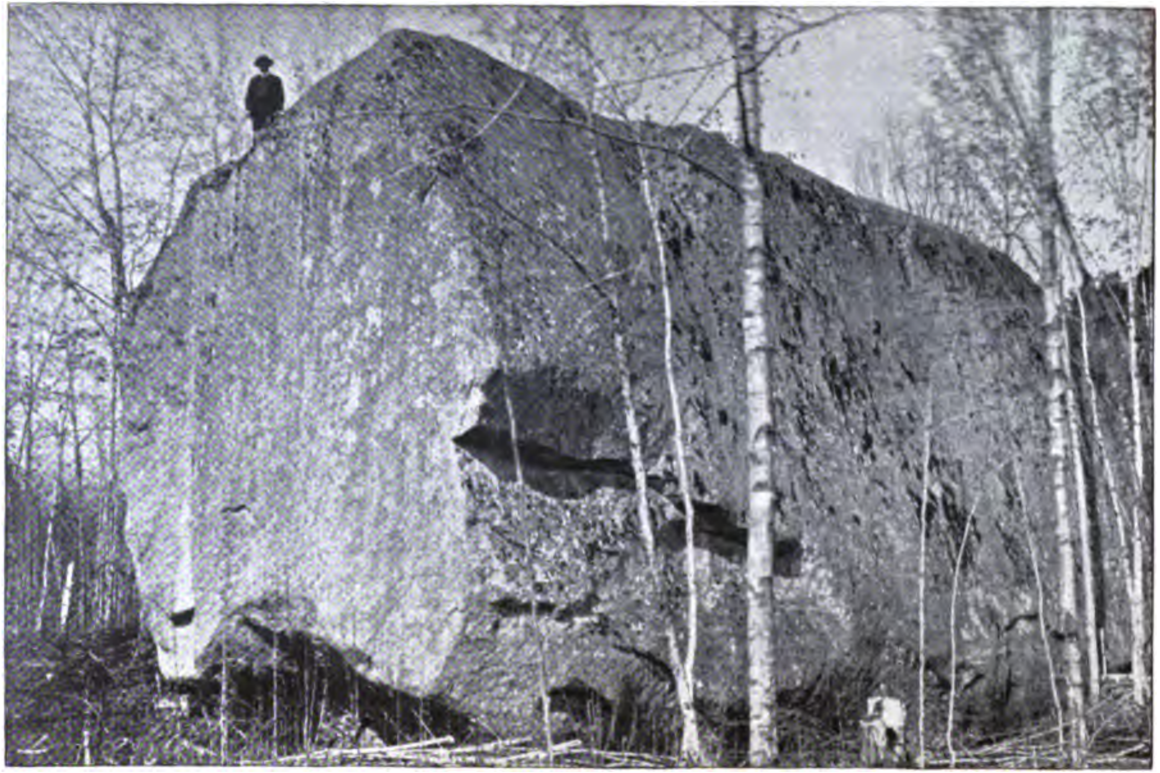
MT. HURRICANE.

This peak, rising to the height of 3,763 feet, stands upon the border of Elizabethtown and Keene, and is specially conspicuous by its sharp, bare summit. Two trails lead to the top, one on the east and one on the west. The former is the continuation of a cart-path which branches from the Elizabethtown road about 2 miles west of that village. It is said to be easily followed. That on the west begins at the farm-house of a Mr. Cox at East Hill in Keene. East Hill is reached from Keene Valley by a cross-road which leaves the Elizabethtown road about 4 miles from Keene Valley at the foot of Spruce Hill, or by another branching off 2 miles farther east at the top of Spruce Hill, close by a little log school-house. From either point the distance to Mr. Cox's is a little over 3 miles; the difference in altitude is about 500 feet. From Mr. Cox's we follow a disused logging-road directly east. In 12 minutes we bear to the left at a fork in the path, and crossing a fence, enter the denser woods. In 30 minutes more of very slight ascent, we reach a brook. The trail follows this for some time, crossing and re-crossing. The ascent becomes quite steep, but the way can be plainly seen without much attention to blazes. In 50 minutes after first crossing the brook we reach a little spring, the last water on the way. In 7 minutes more we emerge from the balsams upon the ledges with thickets of alder, and follow a line of cairns which leads us in 8 minutes more to the top.

Besides the variation in the grouping of the mountains, this point affords us an interesting view of the lowlands to the east with Lake Champlain, the high pass through which runs the road from Elizabethtown to Keene, and the broad and fertile lower valley of Keene. The view of the Marcy group from here is figured in a lithograph in Colvin's report for 1884.

In descending we reach the brook in 20 minutes, cross it for the last time 20 minutes later, pass out of the woods in 18 more, and in 12 more reach the farm-house. The ascent, therefore, from the farm required 1 hour 47 minutes, the descent 1 hour 10 minutes.

By following a sandy road for 1 hour and 10 minutes and keeping to the left at all important forks, we reach the log school-house mentioned above. Instead of returning to Keene Valley by the highway, a distance of 6 or 7 miles, one may take a short cut of 3 or 4 miles through the woods. Passing from the school-house south through the fields, and just to the westward of a detached barn, one crosses a narrow, wet hollow filled with alders, and just beyond an old trail is found well up on the right side of a deep ravine. The path and blazes are plain at first, but later become very indistinct. It leads out into a clearing above Prospect Hill and near the new road to Elizabethtown, about a mile from Keene Valley.



THE MADISON BOWLDER.

The Madison Bowlder.

By W. O. Crosby.

Read October 9, 1889.

The large granite bowlder in the northern part of the town of Madison, N. H., has undoubtedly been known to some of the inhabitants of the town for a long time. That it was not regarded as anything very unusual among bowlders, or at least excited but little curiosity, is evident from the fact that it entirely escaped the attention of Professor Hitchcock and his assistants while engaged, a little more than a decade since, in a thorough geological survey of the State. So far as the outside world is concerned, the discovery of the bowlder appears to date only from the summer of 1888, when it was visited by Mr. Frederick Le Roy Sargent, Miss Lilias Page, and other sojourners in that region. It having thus been brought to the notice of the Club, I was requested by the Councillor of Natural History to make an examination of the great stone and its surroundings, with a view to determining whether or not it is a genuine erratic, and the degree of geological interest attaching to it. My visit was made early in last May; and I was accompanied and greatly assisted by Mr. H. G. Woodward, a student in the Massachusetts Institute of Technology. We found that although lacking in scenic or topographic interest, the Madison bowlder is a noble example of a glacial erratic, unequalled in size and solidity in New Hampshire, if not in New England, and of special geologic interest on account of being readily and clearly traceable to its parent ledge nearly two miles to the northward. A report embodying the principal results of our investigation was submitted to the Council; but it has been deemed advisable, in view of the probable destruction of the bowlder in the near future, to preserve a more complete description of it in the pages of Appalachia.

The Madison bowlder is situated in the broad and deep valley extending south from the Saco, in Conway, to Silver and Ossipee Lakes. The magnitude of this valley is out of all proportion to the insignificant streams which now meander north and south across its floor from the almost imperceptible water-parting or divide between Davis Pond, the source of Pequawket Brook, and Silver Lake, the source of Great Ossipee River. Mr. Upham has shown, however, that the extensive sand-plains south of the water-parting, and the well-developed kames, or gravel ridges, north of it indicate that this valley was not only a main pathway for the great ice-sheet, but that during the close of the glacial period it was swept from north to south by ample floods of water; and it is, perhaps, not impossible that it may have been occupied by the Saco itself in preglacial times.

The bowlder lies in the very bottom of the valley, about one fourth mile northwest of Davis Pond, and but little above its level; while about one thousand feet in the opposite direction, with a rise of perhaps seventy-five feet, brings us to the base of Pine Hill, which rises some six hundred feet above the valley. It is also about three fourths of a mile directly west of the railroad at the point just south of the crossing of Pequawket Brook, where there is a side track, and where a private road comes down from the highway on the east. It is so completely shut in by the forest, a dense second growth of slender beeches and birches, that it can scarcely be made out from any of the higher ground in the vicinity; and *vice versa*, from the top of the great stone but little can be seen of the landscape or the general features of the Pequawket valley. The situation of the bowlder is thus far from striking or impressive; and as already stated, the chief interest attaches to the stone itself and the evidence of its transportation.

It rests upon the somewhat undulating surface of the drift deposits which cover practically the entire floor of the valley; and so far as we could discover, the nearest ledges are at the base of Pine Hill, a thousand feet away. That the great mass is a true bowlder is evident at the first glance; for although it is buried along a part of the south side to a depth of perhaps ten or twelve feet, the northern base simply rests upon the nearly level surface of the ground, and at both ends it rises quite clear of the earth, so that it is possible to look under it for a distance of ten to twenty feet. It is thus seen to lie, not upon a ledge, or rock in place, but upon drift material, and especially upon small bowlders of the same kind of granite.

In form it approximates to a parallelopipedon; and the rectangular outline is especially marked when it is viewed from the north and east, but the southern and western aspects are much more irregular. The north side presents a nearly perfect wall about seventy-five feet long and thirty-five to thirty-seven feet in height, making an angle of only ten degrees with the vertical. The height of this long side is surprisingly uniform, presenting a nearly straight and level sky-line. The east end is a still more perfect plane about twenty-three feet wide, twenty-nine to thirty-seven feet high, and lacking only three degrees of being vertical. The west end, on the contrary, is somewhat tapering or protruding and decidedly irregular, making the maximum length of the bowlder about eighty-three feet; and the south side presents a similar contrast to the northern, bulging considerably toward the middle and west end, so that while the width of the bowlder at the east end is less than twenty-five feet, the maximum width exceeds forty-five and possibly fifty feet. The top is quite level for a breadth of about six feet from the straight northern edge, and then it slopes down toward the south side irregularly, but not so steeply but that one can stand upon it at almost any point. The top was reached by a rude ladder against this sloping side at the point where the earth is banked against the bowlder to the greatest height. The girth of the great stone at the height at which we could conveniently hold the tape-line is 210.5 feet. The form is sufficiently irregular to make the exact determination of the cubic contents somewhat difficult; but it must be approximately equivalent to a parallelopipedon measuring 30 × 40 × 75 feet = 90,000 cubic feet, with a probable error of at least 5,000 cubic feet. The specific gravity of such granite is about 2.7, and a cubic foot probably weighs about 170 pounds, making the total weight of the bowlder, if it measures 90,000 cubic feet, 15,300,000 pounds, or 7,650 tons. The great size of the Madison bowlder is scarcely more impressive than its wonderful solidity and homogeneity. It is composed of precisely the same kind of granite throughout, and is one unbroken block from end to end, without a visible rift or flaw and scarcely a re-entrant angle, — a noble witness to the massive structure of some of our granite hills.

Having settled that the Madison bowlder is a genuine erratic and of respectable size, we turned next to the problem of its source and the distance which it has travelled. Before attempting to locate the ledge from which it was derived it was necessary to give particular attention to the kind of granite of which it is composed. It is a typical example of what has been called the Conway granite in the report of the Geological Survey of New Hampshire, — a coarsely crystalline aggregate of quartz, light gray or pink feldspar, and black mica. Professor Hitchcock has further characterized it as the "disintegrating granite." "Any one who visits the region of Conway cannot but be struck with the immense amount of granitic sand and gravel which is there accumulated. All around the country in the region of Conway numerous large blocks of granite are lying about, which one can kick into a heap of sand."[1] This is true enough of many of the smaller bowlders, and especially of such as are partially buried in the soil, from which they absorb moisture; for they are then rapidly disintegrated by repeated freezing and thawing, — the decay, or "maladie du granit," progressing from below upward. This process is as well exemplified among the numerous granite bowlders on Cape Ann as in Conway. But the great Madison bowlder is a striking exception, and probably for the simple reason that it is virtually free from the soil on three sides and part of the fourth, and rests on smaller bowlders, giving perfect drainage beneath; for a bowlder resembles a house in the relations of drainage to the preservation of the foundations. We have already noted the entire absence of cracks or flaws, which are such a common sign of frost action in bowlders; and in walking around the bowlder one observes no fragments or debris which appear to have been detached from its sides, nor any marked indication whatever that it is being broken or crumbled by the frost or other atmospheric influence.

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[1] Geology of New Hampshire, vol. iii. part iv. p. 195.

The Conway granite is, fortunately, of such a uniform and distinct character that it can be readily and certainly distinguished from all the other rocks of that region. The major diameter of the Madison bowlder trends about west-northwest, or directly toward the end of Pine Hill, on the southern slope of which, as already stated, are the nearest ledges. We found, however, that this hill, from bottom to top and from end to end, is composed entirely of the finely crystalline, white, micaceous granite, traversed by irregular veins of quartz, feldspar, and mica, which Professor Hitchcock has referred to the Montalban series. A ten-foot cube of Conway granite is poised on the very brow of the almost precipitous southern slope of the hill; and still larger blocks are scattered over the summit and gentle northern slope, the largest observed being fully thirty feet in average diameter and fifteen feet high. Evidently the great bowlder cannot have been derived from Pine Hill; and it could scarcely have come from this direction, for on consulting the admirable geological map of the State we find that the course of the glacial striæ and the glacial movement in the Pequawket valley is almost due north and south, or exactly parallel with this part of the valley.

From the summit of Pine Hill, we observed to the northward a prominent line of cliffs extending from the railroad westward to the north side of Whitton's Pond. These we knew must be the precipitous southern slopes of hills similar in form to that on which we stood; for nearly all the hills of that region are very typical examples of the *roche moutonnée* profile due to strong glaciation; presenting on the north, or stoss, side a long, gentle slope where the ice-sheet did its grinding, scratching, and polishing, and on the south, or lee-crag, side a precipitous and unglaciated slope where the ice-sheet did its breaking and quarrying. It is, generally speaking, only from the summit and southern slope of such hills that bowlders can be derived.

In making our way through the forest-covered drift-area to this line of cliffs, we passed several magnificent bowlders of the Conway granite, the largest being approximately thirty-five feet square and twenty feet high. The cliffs proved to be composed entirely of the same rock; and reference to the geological map showed that they mark the southern border of a belt of Conway granite one to two miles wide stretching from the railroad westward toward Mt. Chocorua. To the north, as far as this formation extends, no other cliffs or prominent ledges could be seen, and it thus became evident that we had found the approximate source of the great bowlder. Not only is the granite of precisely the same character, but it exhibits the same massive structure; the most impressive feature of the cliffs, which are from three hundred to four hundred feet high, being the strongly marked and widely separated joint-planes dividing the entire hills into great rectangular blocks. Only such formations can possibly be the source of large bowlders; and it is for precisely this reason that bowlders of the Conway granite are so much more conspicuous than those of any other rock in that region. Among these is the well-known Washington bowlder, near Pine Hill in Conway; but it is only about one-third as large as that so little known near Pine Hill in Madison. The observed direction of glacial movement in this valley points very distinctly to the second cliff west of the railroad, near which the granite is quarried, as the exact home of the great erratic. At the base of this cliff, especially, there is a fine group of large, angular blocks, younger brothers of the great bowlder, which have not strayed so far from the parent ledge. The largest of these is a cube, more than twenty-five feet on the edge. Looking up at the face of the cliff, we can see the great re-entrant angles formed by the removal of these masses; and it is interesting to note that the present orientation of the Madison bowlder, its sloping and rounded side, which was probably a part of the original preglacial surface of the hill, facing the south, indicates that it was only turned slightly, if at all, and not rolled over and over, during its transportation by the ice. The rough nature of the intervening ground made it impossible to determine readily the exact distance between the bowlder and the cliff; but it is certainly not less than one and a half, nor more than two miles.

The largest bowlders heretofore known in New Hampshire are those in the vicinity of Pawtuckaway Mountain, in Nottingham, about sixty miles south of Madison. The more important of these were described and figured by Professor Hitchcock,[1] twelve years ago; and they were believed then to be the largest bowlders ever described in any part of the world. But the largest of the Pawtuckaway bowlders — Churchill Rock — is estimated at only seventy-five thousand cubic feet, being distinctly smaller than the Madison bowlder. It is also much less impressive on account of having been broken by the action of the frost, as the illustration shows, into a number of irregular fragments, which have fallen apart to some extent. Again, the Pawtuckaway bowlder is more deficient in geological interest because the probable distance of its transportation is shorter and much less definite than in the case of the Madison bowlder. But while the Madison bowlder thus easily takes the first place among the erratics of New Hampshire, it has appeared to have a formidable competitor for the championship of New England and the world in Mohegan Rock, in Montville, near New London, Conn., to which attention has recently been called by Professor G. F. Wright.[2] The dimensions are given, on the authority of Mr. David A. Wells, as follows: Eastern side, 54 feet; southern side, 70; western, 56; northern, 58; maximum height, at least 60 feet; and estimated weight, 10,000 tons. Although these data make Mohegan Rock distinctly larger than the Madison bowlder, yet in the absence of published evidence showing that it is a genuine erratic, or that if so it is unbroken or can be proved to have travelled any considerable distance, it was by no means clear that it also excels in general geological interest. The importance of determining as accurately as possible the true rank of the Madison bowlder led the Council of the Club to recommend a more thorough examination of this new candidate for erratic honors; and I have, accordingly, visited Mohegan Rock for that purpose, and with the results detailed below.

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[1] Geology of New Hampshire, vol. iii. part iii. pp. 264 *et seq*.

[2] The Ice Age in North America, p. 208. The stone is here called "Mohegan Rock." The local name seems to be "Shegan Rock," for which, I am informed by Mr. Wells, "Cochegan" is probably the more correct form.

Mohegan Rock is situated in the valley of Stony Brook, about six miles south of Norwich and rather less than one mile west of the main road from Norwich to New London. It is about one-half mile north of the road running northwest from Montville station and' Uncasville toward Oakdale, at the end of the private road leading up the valley of Stony Brook to the farm of Mr. Johnson. Although lying almost in the bottom of the valley and but a few rods west of the brook, the immediate location, on the northeast slope of a gentle knoll and commanding a partial view of the east side of the valley, is rather satisfactory. On the way down from Norwich particular attention was given to the ledges along the road, in the hope of finding some rock formation of sufficiently massive structure to be a possible source of such great bowlders as Mohegan Rock. But the only rocks observed are thin-bedded gneiss and mica schist and rather finely jointed granite, accompanied by no bowlders large enough to attract particular attention; although occasional ledges have been weathered out in such protruding forms that they might, perhaps, be mistaken for bowlders by the unwary. In fact, this proves to have been the case with Mohegan Rock itself; although the first glimpse of the great stone created a suspicion in my mind that it is not a true bowlder, and this suspicion was fully confirmed by closer examination.

The prevailing dip of the gneiss and schist in Montville and especially in the valley of Stony Brook is to the east and east-northeast at moderate angles; and enclosed in these rocks are occasional large veins of coarse granite, which are usually parallel with the bedding planes. Mohegan Rock is simply an angular and prominent remnant of one of these granite veins, still undisturbed in its original position upon the beds of gneiss; and its chief geological interest is found in the fact that notwithstanding its exposed position, it has survived the disintegrating influence of the elements and successfully resisted the pressure of the great ice-sheet. It is an approximately square block, 20 to 25 or 30 feet thick, of coarsely crystalline vein granite, consisting chiefly of feldspar and quartz, with garnets in some parts and but little mica, the most prominent lithological character being the coarse and irregular texture. The upper and lower surfaces are roughly parallel, and slope east-northeast, conformably with the underlying gneiss. The orientation of the mass is such that the angles rather than the sides are directed toward the cardinal points; and the south angle, which is not well defined, and the southeast side rise clear of the ground, through the undercutting action of the frost, forming quite an extensive rock-shelter and affording an opportunity to observe the actual contact of the massive granite and the finely laminated micaceous gneiss. The two rocks appear to be still firmly united and generally conformable; although, as we should naturally expect, the contact breaks across the layers of gneiss occasionally. The granite itself has an indistinctly stratified appearance, due partly to variations in texture, but mainly to a series of irregular joints or cracks which are roughly parallel with the upper and lower surfaces of the mass. The bold and angular outlines so suggestive of an erratic are due to well defined joints perpendicular to the bedding planes. The southeast and southwest sides, which have evidently been long exposed to the action of the elements, are very irregular, projecting considerably below and shelving or retreating above. But the northwest and northeast sides are still straight and wall-like. The former is almost vertical, while the latter, being the lowest side of the inclined block, overhangs 10°–20°; and immediately below this face, near the base of the slope, are one very large and several smaller blocks or fragments which have been detached from the parent ledge, apparently as the result of undermining through the wearing away of the softer supporting gneiss.

The main mass of granite is still sufficiently entire and unbroken, so that it might perhaps, if the ice-sheet should come again, be dislodged and transported a moderate distance without going to pieces; but that it is still *in situ*, a true ledge, and hence not to be compared with the Madison bowlder, there can be no reasonable doubt. But even if Mohegan Rock were an erratic, we could not prove that it has travelled far, for the same kind of granite appears to be abundant in ledges immediately to the northward. We may, however, waive both these considerations, and still rank it below the

Madison bowlder, because it is actually smaller. The dimensions previously quoted are somewhat misleading, since for the southeast and northwest sides they give the extreme northeast and southwest diameter, including the marked protuberance of the southwest side. The actual lengths of the four sides are about as follows: Northwest side, 46 feet; northeast, 58; southeast, 45; and southwest, 70. And in estimating the cubic contents of the ledge these may be regarded as the extreme or maximum dimensions; for the projections would probably be insufficient to make the sides perpendicular within these lines. The "maximum height of at least 60 feet" is only possible, if at all, by reckoning from the lowest point on the lower or down-hill side of the ledge to the highest point on the upper side; but this is manifestly incorrect, since the base is not horizontal. The average thickness, measured perpendicularly to the upper and lower surfaces, can scarcely exceed 25 feet, making the cubic contents less than 70,000 cubic feet, and the weight less than 6,000 tons.

Map of the Country about Boston.

By the Committee in Charge.

The plan of issuing a really good map of the country about Boston, which should plainly indicate its topographic features, has long been entertained by the Appalachian Mountain Club. It seemed eminently appropriate that the Club should do this work for the centre of its field of operations, and such a map would particularly prove serviceable in the organized rambles which have become such a feature in its activities. The great expense of undertaking a survey for this purpose prevented any attempt toward its execution; and after the initiation of the combined State and governmental survey of Massachusetts under the direction of the accomplished topographers of the United States Geological Survey, all thoughts of the plan were given up excepting so far as the Club might avail itself of the results of this particular survey; for it was found on application to the authorities, both State and national, having the survey in charge, that free use would be permitted of transfers from the copper-plates which are the final work of the survey.

Accordingly such a map has been prepared and distributed to the members of the Club. It presents the shape of a rectangle, about thirty by twenty inches, including a land area of about five hundred square miles. The presence of the harbor, with its varied islands and broken outline, renders the effect of the map a specially pleasing one. The scale is 1 : 62,500, with contours for every twenty feet. It is constructed from six distinct sheets of the survey, including, however, the whole of only one. Excepting in this particular, and in the legends outside the map proper upon the margin, it does not differ in any particular from the governmental maps, and is reproduced in the same manner as these and by one of the same establishments. It is printed in three colors, — the contours being brown, the water blue, and the culture black. It was deemed best to reach southward so as just to include the whole of the Blue Hills, and to place the peninsula of Boston as near the centre of the map as practicable. The limitations of the original sheets of the survey decided the precise northern limits of the map ; to enhance its value for harbor and shore excursions, it was decided to include the whole of both the inner and the outer harbor; and the northern and southern limits being decided, the inclusion of Marblehead Neck and Nantasket Beach determined its precise eastern limits; finally, it being carried westward to include the whole of the higher lands of Weston and Lincoln, there seemed no really natural boundary until the Sudbury River and its marginal lowlands were reached, and the better to show these a few of the hills to the westward were included. Boston thus remains not far from the centre of the map, which includes nearly all points to which a day's excursion for outdoor life is ordinarily made. Excepting perhaps to the north, little more could be wished; but as it was desired to keep the map of a convenient size, and to issue it at an extremely low price (any extension to the north would have required additions from three more sheets), the committee in charge deemed that the limits of economy in space and cost had been reached.

It had at one time been planned to make certain additions to the map, such as received names to elevations now unmarked, and curves (from data published by the United States Coast and Geodetic Survey) to indicate the contour of the harbor bottom; but these plans were finally abandoned, — partly because of the expense, together with the delay that would have been required to determine just what changes to introduce; partly from the desire better and sooner to acquaint the people with the excellent results of an undertaking entered into (at least on the part of the State authorities) somewhat hesitatingly, and to train our fellow-citizens into dissatisfaction with the preparation and especially the execution of the maps which they have hitherto been accustomed to handle; to show, further, exactly what the present survey has done for us, and finally, how, when the prime cost of a survey in the field and its office work of charting and engraving on copper has been covered, it is possible to issue maps of any part of that territory with any desired limits and at exceedingly small cost. The aid offered by the United States Geological Survey toward a knowledge of the geography of the country, the Appalachian Mountain Club takes its earliest opportunity to point out by a tangible example.

Bibliography.

THE ICE AGE IN NORTH AMERICA, AND ITS BEARINGS ON THE ANTIQUITY OF MAN. By G. FREDERICK WRIGHT: with an Appendix on the Probable Cause of Glaciation, by Warren Upham. New York, Appleton, 1889.

APPALACHIAN readers will find interesting reading in two parts of Professor Wright's book. One treats of his excursion to Alaska and his sojourn there at the foot of the Muir glacier for a month, with two companions; the other describes the glacial phenomena of New England, on which so much of our peculiar topography depends. The visit to the Muir glacier of Alaska was made in August, 1886; and it may serve as an incentive to our Appalachian explorers to read what a successful month this was in the way of gathering facts worthy of scientific report. The mountains on either side of the valley containing the glacier rise immediately from the water from three to five thousand feet; these were often ascended during fourteen days of fine weather, and from their upper slopes the observers saw spread below them one of the most remarkable views of the world. In that late summer season the mountains were well grassed and richly colored with many kinds of flowers. The bay opened to the south into Cross Sound, enclosed in mountains and broken with islands. From the north came the great glacier, rising in numerous separate snow reservoirs, which all united in the broad central stream. It is two miles wide in some places, but its front in the bay measures only about a mile. It possesses all varieties of séracs, crevasses, moraines, and other glacial features, entitling it to great prominence in the glacial world. It is at present undoubtedly the most eminent glacier in this hemisphere. The height of the ice front was measured, as well as its general surface slope, and its rate of motion at certain points. Especial attention was given to the morainic deposits at its front and sides; for from these one may find much explanation for the gravel deposits so plentifully spread over New England and other northern countries.

The greater part of the work is taken up with the discussion of the signs of former glacial action in this country, and their interpretation. We find accounts of the extensive marginal deposits now recognized over so great a longitudinal extension, but still awaiting much detailed observation before their true correlation is worked out; of the oval hills of drift, commonly called drumlins, following the Irish name; of the mounds and ridges of gravel and sand, called kames and eskers; and briefly of the plains of sand that appear to be little deltas in the numerous temporary lakes that were formed during the retreat of the ice from its great southern advance. Inasmuch as we live on these plains and hills and ridges, and have our excursions upon them, and as all our mountains bear the scorings of the ice sheet, Appalachians must extend their legitimate reading to such works as this one of Professor Wright's, in which they will find as much interest as instruction.

There are certain of the more theoretical portions of the volume which, as Professor Wright states, are still open, and indeed very wide open, to discussion. Such, for example, is the interpretation of certain gravel terraces about Pittsburgh as the product of a temporary glacial dam made by the ice sheet when it crossed the Ohio River at Cincinnati. This explanation was certainly fascinating when first presented; but it appears from later and closer observation that the terraces in the Pittsburgh region are not lacustrine but fluviatile in origin; therefore they cannot any longer be appealed to in confirmation of the existence of a great glacial lake in the Ohio valley. Certain other deposits in some of the Ohio head-waters are also adduced as evidence to the same end; but in the form in which they are now described, they rather allow than compel the hypothesis which Professor Wright advocates. If they are not the product of deposition in a glacial lake, what are they? The question still remains open; and if thus understood, the facts here reported will incite rather than retard observation and discussion of this interesting question.

The objections to the hypothesis of a glacial dam here hinted at do not lie in the least in the impossibility of such an occurrence; for there are many truly lacustrine terraces and deltas in northern Ohio and western New York that find no other explanation, and at the same time do call in the most definite terms for the existence of a body of standing water that had a discharge over a low rise of the land to the southwest. The water was therefore not an arm of the sea; it must have been a lake, and this lake must have been shut in by the front of the retreating sheet of ice. The same explanation is demanded by the shore lines so clearly marked around the plain of the Red River of the North, as described by Upham; but even with these conclusions in mind, it still does not appear advisable to admit the existence of a glacial dam across the Ohio at Cincinnati; because the evidence that has been adduced to support it is not of the same character as that found so continuously and consistently in the other areas referred to. But of all this the reader will find much fuller account in the entertaining book, to which this brief notice refers. W. M. D.

La Période Glaciare, Étudiée principalement en France et en Suisse. Par A. Falsan. 364 pages, with a map of the Quaternary glaciers of France, a profile of the ancient glacier of the

Rhone, and 105 cuts in the text. Paris: Felix Alcan, 108 Boulevard Saint-Germain. 1889.

THE rapid advance made during the past decade in investigations of the glacial drift, and in unfolding the story of the earth during the latest completed chapter of its geologic record, is well indicated by the publication, last year, of Professor Wright's volume, "The Ice Age in North America," and of the book whose title is given above, relating mainly to France and Switzerland. Both these works, however, include also general outlines of the whole range of discovery of the deposits and striation of ancient glaciers and ice-sheets in other parts of the world; and M. Falsan, in treating each phase of his subject, reviews the progress and changes of opinions in explanation of the facts observed. Mountain tourists visiting the French side of the Alps or Pyrenees should not fail to read this treatise, a duodecimo of the Bibliothèque Scientifique Internationale; and it will be a most valuable hand-book for glacialists everywhere. W. U.

ASPECTS OF THE EARTH: A POPULAR ACCOUNT OF SOME FAMILIAR GEOLOGICAL PHENOMENA. By N. S. SHALER, Professor of Geology in Harvard University. Illustrated. New York: Charles Scribner's Sons, 1889.

THIS handsome octavo volume of 344 pages comprises a half-dozen essays which originally appeared in "Scribner's Magazine," here somewhat revised and expanded; and to these is added a seventh, not before printed. Sixteen illustrations form page-plates, and eighty-six others are inserted in the text. All these are admirably executed, most of them being engraved from photographs; but the reader will not agree with the author's modest suggestion that they are the most instructive element in this work.

"The Stability of the Earth" is the first subject considered, attention being chiefly directed to earthquakes. The New England earthquake of 1755 (almost coincident with that of Lisbon), the New Madrid earthquake in 1811, and that of Charleston in 1886 are specially described as the most violent that have occurred in the eastern half of the United States since its settlement by Europeans.

In treating of "Volcanoes," the history and present condition of Vesuvius are given as a type, this among all volcanic mountains being at once the most accessible to travellers and the most definitely known in its past stages of quiescence and activity. The cause of volcanic eruptions is held to be superheated steam, generated by the heat of the earth's interior acting in most cases on the water imprisoned in strata during their deposition and finally becoming deeply buried by overlying sediments. But in explosions of vast magnitude with no previous note of warning, as that of Krakatoa in 1883, of Tarawera, New Zealand, in 1886, and of Bandai-san, Japan, in 1888, the steam is doubtless formed from water of the sea or lakes sinking to the heated interior through some suddenly opened fissure.

"Caverns and Cave Life" are exemplified by the Mammoth Cave in Kentucky, Luray and the Natural Bridge in Virginia, cave-dwellings in Nevada, the Blue Grotto of Capri, and many more. These chasms have been made by subterranean streams, or on the shore of the sea by the rush of its water in storms, the larger caves being in limestone, of which portions have been dissolved and carried away. Next the sculpturing of the earth's surface by running water is very interestingly discussed in a chapter on "Rivers and Valleys," with pictures illustrating ordinary river action, and others showing the sublime cañon of the Colorado and the gorge and fall of the Yellowstone.

Trade-winds, land and sea breezes, the east winds of our Atlantic coast, cyclonic storms and tornadoes, are the themes of an essay entitled "The Instability of the Atmosphere." Another chapter sets forth the geologic evolution of the "Forests of

North America," their effects on rainfall and drainage, the influence of the glacial period on the distribution of our forest trees, and the causes of the limits of forest and prairie regions.

The last chapter, not before published, is on "The Origin and Nature of Soils," tracing the processes of their formation, the effects of the sun's heat, of the atmosphere, and of vegetation, and noticing the availability of rich soils under an arid climate for agriculture by irrigation. In each of these essays Professor Shaler gives a large amount of desirable information in a very attractive style, free from the scientific phrases and technicalities which prevent most readers in this busy age from perusing geologic text-books or the reports of State and national surveys. W. U.

LES CÉVENNES ET LA RÉGION DES CAUSSES. Par E. A. MARTEL. Un vol. in 8vo de 400 pages avec 140 gravures et 11 cartes et plans.

On the edge of the Cévennes in southern France lies a country aside from the ordinary routes of travel, and so little visited that its strange features were but little known seven years ago even to intelligent geographers, while some of its extraordinary characteristics were wholly unknown except to a few of the rude peasants of the neighborhood. It has been reserved for M. Martel, a lawyer of Paris, a member of the French Alpine Club and of the Appalachian Mountain Club, to explore, map, and present to the admiration of all lovers of the picturesque and wonderful in Nature the peculiar scenery of this region.

The book, which is a model monograph, has as its nucleus several papers which the author presented from time to time between 1884 and 1889, to the Academy of Sciences and the French Alpine Club. But these papers, interesting as they are, constitute but a small part of the present volume.

The Causses are dolomite plateaus stretching out westerly from the granite Cévennes. They are traversed and separated by gorges from 1,200 to 1,800 feet deep. They resemble in their geological structure, the bright colors of the rocks, and in their general aspect, the country about the Grand Cañon of the Colorado, though they lack much of the grandeur of the latter. Thus much about the region has long been known in a fragmentary way.

In one of these plateaus of the Causse Noir there was discovered in 1883 a depression less than a square mile in extent, in which the rocks had been worn by the rain and streams through long ages into the semblance of a ruined city, with towers and castles, temples and amphitheatres, and a triumphal arch sixty feet high, resembling very closely in general outline the Gate of the Lions at Mycenæ. This place was known up to that time only to a few shepherds of the neighborhood, and generally shunned by them. They called it Montpellier-le-Vieux. M. Martel spent a portion of the two following summers in examining, photographing, and mapping the district.

Not satisfied with his discoveries above ground, he turned his attention in later years to the exploration of the caves, the entrances to which were known, but which had never been penetrated. Some of them were entered by grottoes in the side walls of the Causses; some of them through sink-holes (bouches de l'enfer) in the plateau. With the expenditure of much time and labor, and often with great risk to life and limb, he penetrated their labyrinths to the depth of 600 feet, and followed one of them for over a mile and a half. With cords and ladders, with windlass and derrick, he made his way to regions where he found it difficult to get his resident helpers to follow him. He kept up his communication with friends above ground by telephone. He floated on the rivers and lakes of the caverns in a canvas boat from Michigan. With his camera he has reproduced in his book some of the beautiful and fantastic stalagmites of those underground halls.

M. Martel is voluminous in his details, exact and lucid in his descriptions, and graphic in the accounts of his personal experiences. The numerous illustrations, many of them the reproductions of photographs, make the features of the scenery live before the eye. Finally, the book possesses that without which no work on geography or travel is complete, — maps. These consist of many plans and sections of the caves, a sketch-map of the whole district of the Causses, and a most excellent map of Montpellier-le-Vieux.

F. W. F.

SIGNOR SELLA'S PHOTOGRAPHS. I., HAUTES ALPES. PHOTOGRAPHIES D'APRÈS NATURE. Par VITTORIO SELLA, C. A. I., A. C., C. A. S. Biella, Italia.

THIS catalogue contains lists of photographs (five hundred and thirty-four in all) taken in the High Alps between the years 1880 and 1888. Such a beautiful and valuable set of mountain views has never been collected before. The size of the prints is 24 × 30 cm., 30 × 40 cm., and 46 × 56 cm. The series embraces views from the summits of Grand Combin, Breithorn, Matterhorn, Dent Blanche, Weisshorn, Lyskamm, Finsteraarhorn, Wetterhorn, Piz Roseg, Pelvoux, Écrins, and other first-class peaks, as well as from lower summits, cols, arêtes, and glaciers. The scene of Signor Sella's recent work is in Dauphiné, and includes fifty-eight magnificent pictures 30 × 40 cm. in size. All that we have seen are perfect specimens of the art of photography, and in the selection of view-points the artist has shown rare skill. Foreign critics give the first place in the collection to the view, "Les Bans from the Col du Selé;" but the picture that really captivates us is a view of a glacier on the Écrins, which shows a very large crevasse and remarkable ridges of snow. It would hardly be possible to obtain finer studies of snow than are shown in this picture (No. 519), and in "Sommet des Rouies" (No. 484).

Of the Dauphiné pictures, a mountaineer who probably knows the peaks of that district as thoroughly as any one, writes:[1] "Such a complete and *cheap* set of views of a limited district of the higher ice and snow regions has probably never before been offered to the public, and I trust that Signor Sella's skill and taste may meet with the reward which they so fully deserve."

Of the views in the Zermatt district we would call special attention to the picture of the Matterhorn from the summit of the Dent d'Hérens (No. 279). Thirty-seven views are devoted to Mt. Etna and vicinity.

Some of these pictures, with a copy of the catalogue, can be found at our Club Room.

F. H. C.

II., FOTOGRAFIE DEL CAUSASO CENTRALE.

SINCE writing the foregoing notice, which was forwarded too late for insertion in Vol. V. No. 4, the results of Signor Sella's photographic work in the Caucasus has been placed before mountaineering and geographical societies. Signor Sella was accompanied (in the summer of 1889) by his brother Erminio Sella, Maquignaz the famous Val Tournanche guide, and three Italian porters. Unfortunately Maquignaz, the skilful climber of the Matterhorn and the Dent du Géant, was taken sick and was obliged to return home; yet the explorers accomplished much photographic work in valleys and among glaciers. The list embraces one hundred and twelve titles. From such a varied collection it is difficult to select pictures for special commendation. One of the beautiful views of Ushba serves as our frontispiece, and the artist has brought home views of the other great giants of the central Caucasus.

From the eastern peak of Elbruz, four panoramic views were secured. These are very successful in every way, but especially so in representing grand cloud effects. In one of these (No. 601), which shows sombre rocks in the foreground, the clouds far below the observer seem to be tossing like the billows of the ocean, and disappear over the distant plain; in another of the same series (No. 602), they look like a great inland sea. Sella generally uses glass negatives, but some beautiful pictures (such as No. 655) were taken on Balagny films.

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[1] W. A. B. Coolidge, Alpine Journal, February, 1889.

These pictures are of interest not only to the geographer and mountaineer, but to the ethnologist as well; for types of the people, their villages, and their antiquities are presented to us. A set of Sella's Caucasian views would be of great value in the libraries of our geographical societies and colleges, as truthfully representing one of the remote quarters of the globe.
F. H. C.

Report of the Recording Secretary for 1889.

On Jan. 1, 1890, the corporate membership of the Club was 729; the losses amounting to 119, and the new members numbering 133, the net gain for the year was 14. Although the number of new members was unusually large, the increase in membership has been small. This is due to the change in the By-laws, which provides that members whose assessment is unpaid November 1 may be dropped. Therefore not only were delinquents for 1888 dropped in March, but delinquents for 1889 were dropped in December. The Life Members number 47. The Honorary and Corresponding Members number, respectively, 13 and 45; John Ball, of London, an Honorary Member, and Maria Mitchell, a Corresponding Member, having deceased, and Arnold Hague having been added to the Corresponding Members. The total membership Jan. 1, 1890, was 787, an increase of 13.

There were held during the year nine regular meetings and one field-meeting, the average attendance being 105. There were presented at these meetings three reports and thirty-one papers, including short papers by eleven members concerning the Rangeley Lakes Camping Trip. The White Mountains had six communications; while Maine, Vermont, Massachusetts, New York, Pennsylvania, Virginia, North Carolina, Kentucky, Colorado, the Yellowstone National Park, and Newfoundland were represented. Four papers were illustrated by the lantern.

A successful field-meeting was held at the Profile House, White Mountains, June 29 – July 6, followed by an interesting excursion to Dixville Notch. For the other excursions and the outings, reference is made to the report of the Excursion Committee.

The Snow-shoe Section accomplished nothing during the year, except that several of its members took advantage of the winter excursion to Jackson in February.

The Section for Field-Study continued its work, and now has 82 members. There were two field-studies, — Rocky Gorge, Newton Upper Falls, May 4; and "Dogtown," Gloucester, October 5.

The annual social meeting was held at the Hotel Vendome, Friday evening, February 8. The attendance was 214, the largest of any such club gathering.

Vol. V. No 3, of APPALACHIA appeared in January, and No. 4 in May. "Mountaineering in Colorado," by Mr. F. H. Chapin, was published by the Club in November; and a small pamphlet, "Some Adirondack Paths," by Mr. F. W. Freeborn, was issued in June.

For work in the different departments reference is made to the reports of the Councillors.

Respectfully submitted,
ROSEWELL B. LAWRENCE,
Recording Secretary.

Report of the Corresponding Secretary for 1889.

THE attention of the Corresponding Secretary to the duties of his office has been greatly interrupted by long-continued ill-health, so that this report must refer mainly to the work done by others in his stead.

Relations of exchange have been established with two new societies, — the National Geographic Society at Washington, D. C., which, though just formed, has issued four numbers of its magazine during the year; and the Svenska Turistförening of Stockholm, which has sent us its annual for 1889.

The New Hampshire State Librarian asked for a set of the publications of this Club, and offered to send in return anything of interest to us he could furnish from the public documents of his State. Although definite relations of exchange had not been established, it seemed best to supply the volumes asked for, as it is eminently proper that they should have a place in the library of the State where most of the mountain work of this Club has been done.

Invitations to attend festivals of European clubs were received, as follows: that of the Siebenbürgischer Karpathenverein, at Broos, August 25; of the Sezione Piceno of the Club Alpino Italiano, at Ascoli-Piceno, August 30 – September 5; of the Deutscher und Österreichischer Alpenverein, at Botzen, September 7–9; and of the Schweizer Alpen-Club, at Zurich, August 17–19. Two members of our Club, — Mr. R. F. Curtis, Vice-President in 1888, and Professor F. D. Allen, the present Councillor of Exploration, — who were in Europe during the summer, were appointed by the Council to represent this Club at any such meetings as they might be able to attend; but neither of them could conveniently be present at any of these reunions.

In response to a request for more shelf-room for the library, a new case was added to the Club-room early in the year, and the books were rearranged, by the kindness of Messrs. Lawrence and Jones, during the illness and absence of the librarian.

Of the 497 numbers added to the library during the year, 11 were bought, 17 given to the Club, and the remainder, mostly serials, received from regular exchanges. Thirty-six volumes have been bound. The library now contains 502 bound volumes and 1,059 pamphlets and unbound magazines.

We have received 76 maps, of which 73 were sent us by the United States Geological Survey.

A list of all these accessions is appended to this report.

F. W. FREEBORN,
Corresponding Secretary.

ACCESSIONS TO THE LIBRARY FOR THE YEAR 1889.

FROM CORRESPONDING SOCIETIES.

American.

Academy of Natural Sciences (Philadelphia). — Proceedings 1888, Part 3; 1889, Part 1.

American Geographical Society. — Bulletin, Vol. XX. 4 and Suppl.; XXI. 1–3.

American Museum of Natural History. — Annual Report for 1888–89; Bulletin, II. 2.

California Academy of Sciences. — Proceedings, Vol. I. 1, 2.
Cambridge Entomological Club. — Psyche, Vol. V. 153–159.
Essex Institute. — Bulletin, Vol. XX. 1–12; XXI. 1–6.
Geological and Natural History Survey of Canada. — Contributions to Canadian Palæontology, Vol. I.
Geological and Natural History Survey of Minnesota. — Annual Report, XVI.
National Geographic Society. — Magazine, Vol. I. 1–4.
New Hampshire Historical Society. — Proceedings, 1888–89.
Smithsonian Institution. — List of Foreign Correspondents, July 1, 1885; Systematic Arrangement of List of Foreign Correspondents, July, 1888.
Torrey Botanical Club. — Bulletin, XV. 6; XVI. 1–12.
United States Geological Survey. — Mineral Resources of the United States, 1887. Bulletin, 40–53; Annual Report, VII. (1885–86); Monographs, XIII., XIV.; Atlas to Monograph XIII.; 73 atlas sheets.
United States War Department. — Annual Report of the Chief Signal Officer, 1887, Part 2; 1888; U. S. Expedition to Lady Franklin Bay and Grinnell Land, Vol. II.

Foreign.

Associació d'Excursions Catalana. — Buttletí, Any XI. 121–123; XII. 124–135; Vol. V. of Folk-Lore Català.
Club Alpin Belge. — Bulletin, 1889, 12.
Club Alpin Français. — (*Direction Centrale*) Annuaire, 1888; Bulletin, 1888, 9; 1889, 1–8. (*Section de Saône-et-Loire*) Bulletin, 12. (*Section du Sud-Ouest*) Bulletin, 24; (*Section des Alpes Maritimes*) Bulletin, IX.
Club Alpino Italiano. — (*Direzione Centrale*) Bollettino, XXI. 54, 55; Rivista, Vol. VIII. 1–7, 9–11.
Club Alpin Suisse. — (*Comité Central*) Jahrbuch, XXIV. Beilage zum Jahrbuch XXIV. (*Section Romandes*) L'Écho des Alpes, 1888, 4; 1889, 1–3.
Norske Turistforening. — Årbog, 1886.
Deutscher und Österreichischer Alpenverein. — Mittheilungen, 1888, 6; 1889, 1–18, 21, 22; Zeitschrift, Vol. XX. 1889.
Magyarországi Karpát-egyesület. — Jahrbuch, XVI. 1889.
Österreichischer Alpen-Club. — Österreichische Alpen-Zeitung, IX., X., XI. 261–285.
Österreichischer Touristen-Club. — Österreichische Touristen-Zeitung, VIII. 21, 24; IX. 2–24.
Siebenbürgischer Karpathenverein. — Jahrbuch, IX.
Società Alpina Friulana. — Cronaca, VII., VIII.
Società degli Alpinisti Tridentini. — Annuario, XIV. 1888.
Svenska Turistförening. — Årsskrift, 1889.

Geographische Gesellschaft (Greifswald). — Jahresbericht III. 2.
Gesellschaft für Erdkunde (Berlin). — Bd. XV. 10; XVI. 1–8.
Imp. Russkoye Geographitcheskoye Obshtschestvo. — Izviestiya, XXIV. 3–6; XXV. 1–3; Otchet, 1888.

Kais.-königliche Geographische Gesellschaft. — Mittheilungen, XXI.

Kais.-kön. naturhistorisches Hofmuseum (Vienna). — Annalen, Bd. III. 2-4; IV. 1-3.

Nederlandsch Aardrijkskundig Genootschap. — Tijdschrift, Ser. II. Deel. V. Mededeelingen 7-10; Deel. VI. 1-10; Meer uitgebreede Artikelen 1.

Royal Geographical Society. — Proceedings, XI. 1-12.

Scottish Geographical Society. — Magazine, Vol. V. 1-12.

Sociedad Geografica (Madrid). — Boletin, Tomo XXIII. 1, 2; XXV. 3-6; XXVI. 1-6; XXVII. 1-3.

Sociedade de Geographia (Lisbon). — Boletim, 8ª Ser. 1-6.

Société de Géographie Commerciale (Bordeaux). — Bulletin, 1888, 1-5, 23, 24; 1889, 1-21.

Société de Géographie Commerciale (Paris). — Bulletin, Tome XI. 3, 4.

Société de Géographie de Tours. — Revue, 1888, 8; 1889, 1-9.

Società Geografica Italiana. — Bollettino, Ser. III. Vol. I. 12; Vol. II. 2-11.

Société Royale de Géographie d'Anvers. — Bulletin, Tome XIII. 3, 4.

Société Khédiviale de Géographie. — Bulletin, Ser. II. Supplément.

Teikoku Daigaku (Imperial University, Tokio). — Calendar for 1888-89; Journal of the College of Science, Vol. II. 5; III. 1, 2.

Verein für Erdkunde (Leipsic). — Mittheilungen, 1888.

OTHER EXCHANGES.

Revue Géographique Internationale, Vol. XIII. 153, 156-158; XIV. 159-163, 165-168.

White Mountain Echo, Vol. X., XI.

DONATIONS.[1]

Mountain Psalms. J. V. von Scheffel. Translated by Mrs. F. Brünnow. Gift of *T. W. Higginson.*

Geological History of Yellowstone National Park. *Arnold Hague.* Gift of Author.

On Glaciers in the Rocky Mountains. *S. F. Emmons.* Gift of Author.

Mountaineering in Colorado. *F. H. Chapin.*

APPALACHIA. — Vol. V. 3, 4.

Abstract of the Proceedings of the Society of Arts. Gift of Massachusetts Institute of Technology.

Drives in Northampton and Vicinity. F. N. Kneeland. Gift of Author.

The Ash Bed at Meriden and its Structural Relations. *Wm. M. Davis.* Gift of Author.

The Physical Features of New England. *Wm. M. Davis.* Gift of Author.

Astronomical Observatory of Harvard College: Annals, XX. Part 1. From the Observatory.

New York Forest Commission: Annual Report for Year ending Sept. 30, 1888. Gift of Forest Commission.

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[1] Names of Club members are in italics.

Sur les Cartes Géologiques à l'occasion du "Mapoteca Geologica Americana." *Jules Marcou.* Gift of Author.

Nouvelles Recherches sur l'origine du nom d'Amérique. *Jules Marcou.* Gift of Author.

American Geological Classification and Nomenclature. *Jules Marcou.* Gift of Author.

Canadian Geological Classification for the Province of Quebec. *Jules Marcou.* Gift of Author.

Über den Monte Amiata in Toscana und seine Gesteine. J. F. Williams. Gift of Author.

Mountain Outline (from Lowell, Mass.). *W. P. Atwood.* Gift of Author.

Rambles and Drives about Bethlehem. W. T. Oliver. Gift of Author.

Roads and Paths about North Conway and Jackson. W. T. Oliver. Gift of Author.

Some Adirondack Paths. *F. W. Freeborn.*

Earlier Cretaceous Rocks of the Northwest of Canada. *Geo. M. Dawson.* Gift of Author.

Bulletin of N. E. Meteorological Society, Nos. 49–63.

PURCHASED.

Alpenwanderungen. A. W. Grube.

Notes of a Naturalist in South America. *John Ball.*

Untrodden Peaks and Unfrequented Valleys. Amelia B. Edwards.

Shores and Alps of Alaska. H. W. Seton-Karr.

Days out of Doors. Chas. C. Abbott.

The Ice Age in North America. G. F. Wright.

Marocco and the Great Atlas. J. D. Hooker and *John Ball.*

The Queen's Highway. Stuart Cumberland.

A Lady's Life in the Rocky Mountains. Isabella L. Bird.

Treasurer's Report for 1889.

RECEIPTS.

Cash on hand, Jan. 1, 1889		$821.08
Life-Memberships: Mrs. E. F. Crosby, Mrs. W. S. Fenollosa, Mr. H. B. Hastings, Mr. T. W. Harris, — 4 at $30		120.00
Admission fees:		
From 131 new members at $5	$655.00	
Assessments from 23 members for 1888.		
" " 539 " " 1889.		
" " 9 " " 1890.		
Total . . 571 at $3	1,713.00	
Amounts carried forward	$2,368.00	$941.08

Amounts brought forward		$2,368.00	$941.08
Interest :			
On Treasurer's Bank accounts	$36.59		
On Reserve Fund to Jan. 1, 1890	114.70		
		151.29	
Committee on Annual Reception, balance		11.48	
Committee on Room, from sale of keys		3.00	
Donations :			
For illustrating APPALACHIA	$72.60		
C. R. Milliken for Madison-Spring Stone Hut	25.00		
W. H. Cades for Club Room	5.00		
Mrs. P. R. Hollingsworth for Department of Art	5.00		
Mrs. J. H. Thorndike for general expenses	10.00		
David C. Lyon " " "	7.00		
		124.60	
Sales of APPALACHIA		93.85	
Total Income			2,752.22
			$3,693.30

PAYMENTS.

To Trustees of the Permanent Fund,			
Amount appropriated by Club, Jan. 9, 1889		$100.00	
For 4 Life-Memberships		120.00	
			$220.00
To Trustees of the Reserve Fund,			
Interest on the Fund appropriated to it by Council			114.70
Postage and stationery		$178.07	
Printing and advertising		212.70	
Clerical services		123.75	
Expenses of meetings		61.50	
APPALACHIA, and other Publications,			
For Vol. V. No. 3	$295.12		
Delivery of same, additional	2.14		
Vol. V. No. 4	355.56		
Delivery of same	39.00		
Index to Vol. V.	8.00		
"Adirondack Paths"	47.59		
"Mountaineering in Colorado"	350.00		
Sundries	30.50		
		1,127.91	
Library :			
For Books	$23.66		
Binding	43.67		
		67.33	
Amounts carried forward		$1,771.26	$334.70

Amounts brought forward		$1,771.26	$334.70
Room:			
For Rent	$400.00		
Book-cases	34.00		
Care, etc.	53.34		
		487.34	
Department of Topography:			
For work on Middlesex Fells Map		7.20	
Department of Improvements:			
For Madison-Spring Stone Hut, additional	$62.47		
Mt. Liberty path	30.00		
Record Bottles	13.10		
Maps	3.01		
Work on Mt. Adams Camp under direction of Mr. W. G. Nowell	10.00		
		118.58	
Department of Natural History:			
For expert examination of Madison Bowlder		$14.50	
Department of Art			
For Photographs and Albums		$72.26	
Field Meetings and Excursions		7.36	
Total expenses			2,478.50
Total payments			$2,813.20
Cash on hand at close of the year			880.10
Five Cent Savings Bank	$512.94		
Union Safe Deposit Vaults	367.16		
	$880.10		
			$3,693.30

It is pleasant to call attention to the prosperity of the Club, as indicated by the fact that the amounts received for annual dues and for admission fees have been larger than in any previous year.

For the first time no subscription has been solicited to meet any part of the expense of the Club Room. The advantages and necessity of a room as headquarters, for committee meetings and other uses, are so well established as to make it reasonable to pay the cost from the general funds. During the year several unsolicited donations have been received for this and other expenses.

The Club has assisted in publishing a book by Mr. F. H. Chapin, "Mountaineering in Colorado." The amount thus invested will be reimbursed to the Club during the coming year from sales of the book.[1]

The Council voted to add to the Reserve Fund the interest which has accrued on it. The amount covered by this vote and one passed a year ago is $114.70, making the total of the Reserve Fund $1214.70.

The Council also voted to ask you to add to the Permanent Fund the accumulated interest, up to time of last payments. Last year similar votes were passed; but the amount of interest intended by them could not readily be determined, and therefore was not entered in the accounts at that time. If the appropriation is voted to-day, the amount under the two votes — of Jan. 9, 1889, and Jan. 8, 1890 — will be $133.48, and the total of the Permanent Fund will be $2133.48.

The Report of the Trustees will show that these are the amounts that they hold invested.

Respectfully submitted,

JOHN E. ALDEN,
Treasurer.

BOSTON, Jan. 8, 1890.

The undersigned have examined the accounts of John E. Alden, Treasurer of the Appalachian Mountain Club, for the year 1889, and find them correct, with satisfactory vouchers for all payments. The cash in the hands of the Treasurer has been verified, and amounts to $880.10.

HARRY H. BARRETT, } *Auditors.*
A. SELWYN LYNDE, }

BOSTON, Jan. 7, 1890.

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[1] In March, 1890, this amount was reimbursed to the Club. — J. E. A., *Treas.*

STATEMENT OF RECEIPTS FOR FIRST FOURTEEN YEARS.

Year.	Memberships.					Life Membership.	Sales of Appalachia and other publications.	Interest.	Annual Reception.	Field Meetings and Excursions.	Donations.	Total.
	Admission Fees.	Yearly Assessments.	Back Assessments.	Advance Assessments.	Total.							
1876	252.00	....	....	....	252.00	....	43.18	....	....	....	....	295.18
1877	50.00	254.00	8.00	....	312.00	....	98.00	....	....	....	....	410.00
1878	54.00	264.00	....	....	318.00	60.00	75.70	....	....	....	43.00	496.70
1879	148.00	256.00	40.00	4.00	448.00	....	130.85	1.90	...	....	221.70	802.45
1880	178.00	332.00	24.00	4.00	538.00	90.00	116.90	10.79	....	....	86.21	841.90
1881	222.00	384.00	18.00	12.00	636.00	120.00	141.40	17.59	....	....	62.55	977.54
1882	256.00	528.00	74.00	....	858.00	90.00	309.43	22.07	....	....	2.00	1281.50
1883	395.00	1000.00	20.00	27.00	1442.00	210.00	197.58	39.72	9.72	82.88	22.00	2003.90
1884	285.00	1059.00	21.00	9.00	1374.00	60.00	93.51	53.29	26.80	11.47	1.00	1620.07
1885	375.00	1212.00	69.00	12.00	1668.00	60.00	113.19	61.09	.45	70.73	534.50	2507.96
1886	426.00	1317.00	90.00	24.00	1857.00	330.00	247.94	88.62	12.50	124.35	364.20	3024.61
1887	385.00	1491.00	90.00	42.00	2008.00	180.00	183.80	79.34	10.00	40.20	114.00	2615.34
1888	355.00	1536.00	117.00	12.00	2020.00	180.00	67.06	42.52	9.20	45.94	754.76	3119.48
1889	655.00	1617.00	69.00	27.00	2368.00	120.00	93.85	151.29	11.48	....	127.60[1]	2872.22
Total	4036.00	11250.00	640.00	173.00	16099.00	1500.00	1912.84	568.22	80.15	375.57	2333.52	22868.80

STATEMENT OF EXPENDITURES FOR FIRST FOURTEEN YEARS.

Year.	Permanent Fund.	Reserve Fund.	Stationery, Postage, and Printing.	Appalachia and other Publications.	Department of Topography.	Improvements and Explorations.	Natural History and Art.	Clerical Expenses.	Expenses of Meetings.	Library.	Club Room.	Donations.	Total.
1876	....	....	109.91	140.86	....	15.00	....	....	....	....	....	....	265.77
1877	....	....	60.65	364.18	....	....	13.45	....	....	....	....	....	438.28
1878	....	....	202.31	169.80	2.00	20.00	52.48	....	....	....	....	....	446.59
1879	60.00	....	162.31	347.92	19.20	158.76	....	....	....	....	....	....	748.19
1880	90.00	....	186.17	318.13	19.00	72.60	....	....	....	....	....	....	685.90
1881	120.00	....	394.09	246.23	37.95	68.00	....	19.75	22.70	....	....	....	908.72
1882	90.00	....	258.99	675.93	25.40	....	....	34.50	25.00	....	....	....	1109.82
1883	281.72	....	389.73	866.27	23.65	160.37	....	67.41	1.38	69.78	....	....	1860.31
1884	113.42	....	382.49	1176.53	....	21.00	....	57.62	....	58.10	....	....	1809.16
1885	86.48	....	363.27	361.31	229.00	102.00	....	106.00	53.06	72.50	284.17	25.00	1682.79
1886	270.00	....	432.38	932.91	77.73	46.00	74.00	121.45	171.15	131.72	667.30	49.88	2974.52
1887	383.38	1000.00	289.38	566.71	538.97	128.02	20.12	107.12	145.45	102.50	504.81	....	3786.46
1888	280.00	100.00	473.95	597.59	....	779.55	8.82	49.50	93.45	120.56	456.12	....	2959.04
1889	220.00	114.70	390.77	1127.91	7.20	118.58	86.76	123.75	68.86	67.33	487.34	....	2813.20
Total	2000.00	1214.70	4096.40	7892.28	980.10	1684.88	255.13	637.10	581.05	622.49	2399.74	74.88	21988.70

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[1] Including $3.00 for keys.

Report of the Trustees of the Permanent and Reserve Funds for 1889.

PERMANENT FUND.

1889.				
January 5.	On deposit in Suffolk Savings Bank, Book No. 100,753		$1,218.94	
January 5.	On deposit in Provident Institution for Savings, Book No. 118,265	$614.56		
June 28.	Deposited Amount received from Treasurer A. M. C., for 3 Life-Memberships	90.00		
	For Appropriation made Jan. 9, 1889, by the Club to Permanent Fund	100.00		
1890.				
January 2.	Deposited Amount Received from Treasurer for 1 Life-Membership	30.00	834.56	
January 8.	Total of Principal on hand			$2,053.50

INTEREST ACCOUNT.

1890.			
	Interest on Deposit in Suffolk Savings Bank up to October, 1889	$49.22	
	Interest on Deposit in Provident Institution for Savings up to July, 1889	30.76	
January 8.	Total Interest on hand and subject to Action of the Club		$79.98

RESERVE FUND.

1889.			
January 5.	On hand as Loan to Massachusetts Loan and Trust Co., secured by their Note	$1140.00	
1890.			
January 1.	Interest on the above to date	74.70	
	Total on hand		$1,214.70

CHAS. W. KENNARD, }
WM. H. NILES, } *Trustees.*
REST F. CURTIS, }

BOSTON, Jan. 8, 1890.

Reports of the Councillors for the Autumn of 1889.

Natural History.

BY JULIA C. CLARKE.

IT is to be regretted that there is but little to offer for the year's record in natural history.

The barometers and thermometers owned by the Club remain chiefly in the same hands as last year, under the direction of the New England Meteorological Society.

Last spring, an examination of the great bowlder in Madison, N. H., was made by Professor William O. Crosby to ascertain its true character, in view of an appeal which had been made to the Club to buy it, in order to preserve it from destruction. A detailed account of this work, illustrated by photographs, was presented to the Club by Professor Crosby himself, at the regular meeting of Oct. 9, 1889. Since that investigation inquiries have been instituted concerning the cost of the bowlder and of such land as ought to accompany it, but no further action by the Club has thus far been deemed expedient.

It seems hardly possible for the Club to discover much in a region that has been so closely scanned by specialists; yet valuable service might be rendered even by ordinary observers, if they would contribute definite notes of the localities among the mountains where they find certain flowers, insects, or birds, with the dates of finding them. This would be particularly worth while when the observer returns year by year to the same place. Such a "Naturalist's Calendar" for any one of our mountain regions as that which White of Selborne and his friend Markwick of Catsfield made for their respective neighborhoods in England, would at least give pleasure to many and probably be of real help to some.

WATERFALLS IN THE CATSKILL MOUNTAINS. BY W. M. DAVIS.

THE Catskill Mountains seem to be examples of a composite topography; the moderate slopes and scattered rounded summits of the plateau being the product of long-continued denudation of a greater mass during a time of much less elevation than at present, by which the surface was carried beyond its maturity of form toward the gentler relief of old age; while the deep dissection of the mass by its valleys and cloves marks the early stage of a later cycle of work at a decidedly greater elevation. I had supposed until a recent visit that the falls in the Kaaterskill Clove were simply a normal product of the action of streams in the later cycle, as they are not uncommonly farther south, beyond the glaciated area, where headwater streams often leap over benches of hard rocks that they have not yet worn back to a gentle slope; but it appears, from examination on the ground, that both Haines's Falls, at the head of the clove, and the Kaaterskill Falls, at the head of a branch ravine on the north side of the clove, are practically, like all the other falls of the glaciated region, a product of the displacement of pre-glacial streams from their normal courses to new channels by means of drift obstruction. On the new courses the streams have to do over again the work that they had accomplished some time before the glacial accident; and they for this reason now present forms of distinct immaturity in their high falls and encircling amphitheatres. The stream at Haines's Falls is somewhat south of the general line of the clove, and has cut through a mass of drift to its present rocky platform the drift contains many scratched stones and some crystallines. Up stream from the falls and to the north of the stream, the fields have the expression of drift-heaps; and in their continuation toward the clove there is a long bare slide of drift, conspicuous as one walks up the road from Palenville: it is here that I suppose the buried pre-glacial valley lies. If the stream had settled again on this line, it would have simply cleaned out its old channel, and there would have been no falls unless a small leap might have been discovered farther up the valley, surviving from the unfinished work before the ice invasion; but the drift-heaps seem to have been heavier in the line of the old stream than a little farther south, and hence the post-glacial stream was turned on to the southern slope of its old valley, where it quickly washed out a gulley, a ravine, an amphitheatre, under the hard beds which now define the falls; and in this initial stage of its work we now see it.

A similar statement may be made for Kaaterskill Falls. Here the stream seems to have been thrown to the eastern slope of its old valley. The evidence of obstruction is not only seen in the heavy drift west of the falls along and below the railroad, but also in the occurrence of a shallow pond or lake on the plateau above the falls to the northeast. Nothing could be more abnormal than a lake at a high level in a plateau mass of structure and history such as those of the Catskills; and its origin is best referred to the same drift obstruction of an old open drainage-line that accounts for the falls.

Similar falls, but of less height, may be seen on certain branches of Schoharie Creek, on the northwestern side of the mountains; and when the drainage of the region is fully explored, many more examples of the same kind will pretty surely be recognized.

Reports of the Councillors for the Autumn of 1889.

Art.

BY JOHN RITCHIE, JR.

THE department of Art has been quite active during the year in collecting photographs of mountainous regions in this country, and caring for them in a way that will insure their preservation with a minimum of injury.

The interest of Mr. F. H. Chapin in the Club has been the means of securing for us four albums of the admirable views which have been a part of the results of his various Colorado trips. These albums comprise Long's Peak, thirty-six views; Long's Peak and Mummy Mountain, fifty-two views; Estes Park, forty-two views; Sierra Blanca, and the vicinity of Pike's Peak, fifty-nine views. The books have been secured at the bare cost of the materials, Mr. Chapin kindly assuming all care of the selection of views, and the supervision of the mounting and binding.

A Ktaadn volume, containing thirty-five views from her own camera, has been presented by Miss Rose Hollingsworth.

The photographs taken by Mr. and Mrs. T. E. M. White, of North Conway, N. H., rank with any in the world in artistic finish, and the more difficult feature of securing distant mountain ranges. A North Conway volume containing about fifty views has been acquired by purchase. The Councillor hopes that a more complete series of the White Mountain pictures from the camera of these artists may be secured.

The photographs of Berkshire, mentioned in the last report, have been assembled in the Berkshire book. This series — the immediate result of the Club excursion of 1888 to Mt. Washington, Mass. — includes views taken by Mrs. I. C. Barrows, Mr. W. R. Davis, Mr. H. A. L. Potter, and the Councillor.

A volume entitled "A. M. C. Excursions of 1889," the eighth bound volume of the present year, contains upward of one hundred views of places visited during the Club trips of the present year, including views of Jackson (in winter), of Charlestown, N. H., and Ascutney, the Southern

Kearsarge, the upper Pemigewassett Valley, Dixville Notch, the Camp at Rangeley Lakes, Mts. Tom and Holyoke, Chesterfield, Cummington, Ashfield, and points visited during our Saturday outings.

Some half-dozen of these photographs have been acquired by purchase. Of the balance, Mr. W. R. Davis presents eighty; Mr. I. Y. Chubbuck, four; Mrs. A. F. Cutler, three; and the Councillor, seventeen.

During the year the department has received as gifts, in addition to those already named, the following photographs:

Thirteen views of Dixville Notch, from Mrs. Parsons, of Dixville.
Two views of Dixville Notch, from Rev. W. F. Dusseault.
Twenty-one views of Middlesex Fells, from Mr. W. H. Cades.
One view of Monadnock, from Mr. W. H. Cades.
Fifteen views of Andover, Me., from Mr. W. S. Fox.
One portrait of Louis Agassiz, from Dr. Thomas Crozier.
One large view of Sierra Blanca by W. H. Jackson, from the Publishing Committee.

The amount expended during the year has been about fifty dollars. The custom of furnishing unmounted views which has characterized the gifts of the past year, has been highly appreciated, since it allows of preservation in albums under the best conditions.

The eight completed volumes are at the room of the Club, where they may be inspected by members, and have already afforded much enjoyment to those who have had occasion to pass an hour or so at this pleasant place.

Reports of the Councillors for the Autumn of 1889.

Exploration.

By Frank O. Carpenter.

The Councillor of Exploration has the honor of presenting his report for 1889.

The Councillor in the Spring recommended to the Club certain districts needing exploration, and hoped that much of it would be done in connection with the Club meeting in July at Dixville Notch. But these hopes were not realized, as none of the members were able to devote any time to that section. In Maine, Mr. Merriam has made some interesting investigations; and his Report, already laid before the Club, is printed as an appendix to this Report. Other work in different localities will be found appended, or will be presented at Club meetings in the future. As the places of special interest in the White Mountains are now nearly all explored, the members of the Club, of necessity, turn their attention to mountains more remote.

The Club has reason to feel just pride in the Reports which are presented each year of work among the Adirondacks and the Rocky Mountains. The Councillor devoted his time during the summer of 1889 to the southern portions of the Appalachian chain in North Carolina and Tennessee, and traversed a part of the Great Smoky Mountains. The mountains south of Pennsylvania in the Appalachian chain are practically unknown to the Club. Great peaks higher than Mt. Washington, hundreds of miles of ranges, beautiful forests, and many interesting types of people await the explorer, to supplement the work done by the Geological Survey. No satisfactory guide-book or map exists, and few capable guides can be found, though one or both of these wants must be supplied before the North Carolina mountains can become accessible to the ordinary tourist or visitor.

The Councillor wishes, in retiring from his position, to express the thanks of the department as well as his own to all who have so kindly aided in the work of exploration for the past three years, and for the many kindly courtesies which have been shown to him.

PARLIN POND BALD MOUNTAIN. BY EDMUND F. MERRIAM.

THIS peak is claimed to be the second highest elevation in Maine. It is located in No. 3 of Range VI. in the northern part of the Bingham Purchase, and is the property of the heirs of the Coburn Estate. So far as is known, no correct measurements of its height have ever been taken. The land at Parlin Pond Hotel is about 1,700 feet above the sea, and the mountain is estimated at 2,500 feet higher, which would make its height about 4,200 feet. It is doubtful whether the peak is 2,500 feet above Parlin Pond; but probably the height of the mountain is not far from

4,000 feet above the sea. Mr. George Jones, an experienced guide and hunter at the Forks of the Kennebec, thinks Bald Mountain is higher than Mt. Bigelow. He judges by the snow which gathers on Bald Mountain long before its appearance on any other mountain in that region. Mr. Moses Thompson, of Bingham, a surveyor of long experience, and who is thoroughly acquainted with all that region, says he has taken levels from the summit of Bald Mountain, and making the best calculations he could, he found it considerably above any points in that vicinity.

Parlin Pond Hotel is the only house in Parlin Pond township, and is on the old Canada road, about midway between the Forks of the Kennebec and Moose River, fifteen miles from each. It is claimed to be the highest house in Maine which is occupied as a permanent residence. The hunting and fishing in the region are superior. Bald Mountain is about five miles southwest of the hotel, and is reached by following a logging-road two miles west, from which the peak must be reached through the woods. There is much undergrowth, and the travelling is difficult. The form of the mountain is like a triangle, with the highest peak at the southwest angle. The southern and western sides appear to be precipitous. A long ridge slopes away from the peak to the north, and a longer and more broken one to the west. Between these, a bowl-shaped depression slopes from the foot of the peak gently to the northwest. In this is found an abundance of excellent water. The mountain is covered with forest growth to the summit, which is itself densely covered with spruce scrub about breast-high. There are no bare ledges on or near the summit; but it is formed of loose broken rocks underneath the growth, like those found on the summits of Washington and Katahdin. It would seem impossible that the ice-sheet had passed over the peak of this mountain.

With a friend I visited Parlin Pond Bald Mountain early in July, 1889, and having an excellent compass, I took the following directions, allowing five degrees' variation, which I was informed was that allowed in the surveys of the region: Attean Pond, N. 20° to 25° W.; Mt. Bigelow, S. 35° W.; Saddleback (?), S. S. W., also Spencer Mountains (near by); Pierce Pond Mountain, S. 10° W.; Moxie Mountain, S. S. E.; Pleasant Pond Mountain, S. 40° E.; Mosquito Mountain, S. 50° E.; Bald Mountain (Blanchard), S. 51° E.; Squaw Mountain (Moosehead), E. 10° S.; Katahdin, E. 35° N.; Parlin Pond House, N. E.; Spencer Mountains (east of Moosehead), E. 12° N.

The broad part of lower Moosehead Lake is seen from the mountain, and all the upper part. From this part of Moosehead, Parlin Pond Bald Mountain is a conspicuous feature of the landscape, and from the upper end of the lake Katahdin and Bald are about equally distant, and appear almost equally prominent.

It is very desirable that the correct height of this very conspicuous feature of central Maine should be ascertained, and that it should be visited by some one capable of solving the many interesting questions which suggest themselves to a visitor. It is also desirable that a more distinctive and appropriate name should be found for the mountain. The name could be changed without much difficulty as, by securing the consent of the managers of the Coburn Estate, and the co-operation of the very few people in the vicinity, the new name would soon become current. The outline of the mountain is of singular beauty, being formed of two "lines of beauty," as they are known in art, meeting in a sharp peak. As the mountain is at the source of Enchanted Stream, a branch of the Dead River, it is suggested that "Enchanted Mountain" would not be an inappropriate name.

GIANT STAIRS. BY H. P. NICHOLS.

ON Saturday, June 29, I made an interesting ascent of the Giant Stairs, which deserves record for future service.

We left Intervale at 3.30 A. M., walking in the freshness of the day. Nine miles of highway, past Glen Station and turning to the right up the Jericho Road, brought us to a new mill in the alpine glen between Iron Mountain and Parker. Following the valley of Rocky Branch by a wood-road about an hour farther, we turned up the brook to the left, coming from the *col to the south of North Resolution* (rather than the next brook, usually taken).

This brook proved to be very striking, in about half an hour turning at a sharp angle and falling sheer some forty feet. Thence it slid down ledges which we followed up to within a few rods of the top, — an easy, noble climb, full of the rarest features of remote White Mountain work.

We were on the top of North Resolution at ten, 6½ hours from Intervale, a little over 6 hours from Glen Station. The view from here of the Giant Stairs is most impressive, and the climb takes 50 minutes more.

Our return was by way of Mt. Crawford, whose view into the Crawford Notch is so unique and impressive. We skirted the west sides of shaly Resolution, and reached the top of Crawford in 2 hours 30 minutes from the Stairs, including 15 minutes for lunch. Springs start from all ravines.

Bearing then to the southeast along the ledges of Crawford, we struck after an hour's walk on the higher levels down into the valley of Razor Brook. We were soon on a good wood-road, and pushed on to Upper Bartlett and a freight train at 4.40. Thermometer, 90°. Time from summit of Giant Stairs, 5 hours 20 minutes.

Intervale	3.30 A.M.
End of Road, Jericho Mill	6.00 A.M.
Brook from Resolution	7.15 A.M.
North Resolution	10.00 A.M.
Giant Stairs	10.50 A.M.
Crawford	2.00 P.M.
Upper Bartlett	4.40 P.M.

13 hours. 2 hours, rests, etc.

Reports of the Councillors for the Autumn of 1889.

Improvements.

By Frederic D. Allen.

The Councillor was absent from the country during the summer months, and was obliged to devolve his duties on others; but efficient substitutes were not lacking, and the work of the department has in no wise suffered. Mr. Ritchie was kind enough to attend to the necessary disbursements during his absence. Mr. Edmands most generously volunteered to superintend the completion of the Madison Spring Club Hut. This was successfully accomplished before the end of June, at a cost of over $60. The hut was used by several camping-parties during the past summer, and is certain to be frequently occupied in the future. For the present at least, it stands open to all comers, under compliance with rules which are posted inside. There still remains some work to be done in the interior; and some further articles of furniture must be supplied, before the hut is as convenient as it ought to be.

The opening of a path from the Flume House to the summit of Mt. Liberty, with an extension along the ridge to the summit of the "Haystack," is an important addition to our mountaineering facilities. The route from Haystack over Lincoln to Lafayette has been open for several years, and the new path constitutes a desirable supplement to this. The credit for this enterprise is especially due to Mr. Franklin Clark, of North Woodstock, who collected a large part of the money, and superintended the work. The Club furnished $30 toward this path, at the recommendation of Mr. Carpenter, from whom I have received the following description: —

"The path begins at the Flume House, follows the regular path to the Pool and beyond it to Langton's Falls. Then it enters the forest, and passes directly towards Mt. Liberty, and up the side of the mountain, — a distance of about three and one-half miles. From the summit it passes along the ridge a short distance, and crosses a ravine to the summit of what is called Little Haystack. There it connects with an old path which leads to the path from the Profile House to

Mt. Lafayette, which it joins above the tree-line. The length of the new path is as follows (approximately): Flume House to Pool, one-half mile; to Langton's Falls, a few rods; to the summit of Mt. Liberty, three and one-half miles; to the summit of Haystack, two miles.

"There is now a plain path, easy to be followed, from the Profile House to the Flume House over the Lafayette range, about twelve miles long. With the exception of the Presidential range, there is no other walk in the White Mountains that affords such fine views. The walk from the Flume House towards Lafayette is preferable to the walk in the opposite direction, because the sharp rock-peaks of Lafayette and Lincoln are continually in sight. Many of the views of the peaks are unsurpassed in the entire mountain region."

The Club has furthermore contributed $10, at Mr. Nowell's request, towards the rebuilding of the old camp on Lowe's path to Mt. Adams.[1] Mr. Nowell has done further work on the paths in that region, marking the route through King's Ravine with paint, and preparing twenty new signs and distance-boards. He also spent many hours in clearing further the top of Ball Mountain.[2]

Record-cylinders have been placed at the Madison Spring Hut and on three summits in the Adirondacks, — Marcy, Haystack, and Dix. New cylinders have also been put on Tripyramid, Adams, Jefferson, and Madison.

Report of the Excursion Committee for 1889.

During the year nine excursions have been conducted by the Committee. The shorter trips include two long walks, two field studies, thirty Saturday outings, and three all-day outings.

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[1] See Appalachia, vol. v. p. 250.

[2] The account of the money collected through the efforts of Mr. Nowell last year and expended for Club purposes was, through a misunderstanding, omitted from last year's report. I supply it now: —

Received from Randolph Hill House and guests (through Mrs. F. W. Sampson), $5; Ravine House and guests (through Mr. E. B. Cook), $8; Mt. Adams House and guests, $9; E. A. Crawford & Sons and guests, $8; Highland House, $1.50; Messrs. Wright, $7; W. G. Nowell, $11.37; Department of Improvements, $15; total, $64.87.

Paid to L. M. Watson, labor, lumber, freightage, $11.87; C. E. Lowe, labor, $20; H. Hunt, labor, $30; material, $3; total, $64.87.

The number of excursions has been large, owing to the many school vacation days; and the list is as follows: Jackson, N. H., Charlestown, N. H., Southern Kearsarge, Franconia Notch, Dixville, Rangeley, Tom and Holyoke, Chesterfield and Ashfield, Mass.

The Winter Excursion had for its headquarters the Eagle Mountain House at Jackson, being the Club's fourth winter trip to this locality. Eleven persons, including four ladies, constituted the party, which left Boston on February 11. The following are the statistics of the various trips: February 12, across the valley, seven persons; February 13, Thorn, Middle, and Tin Mountains, eight; February 14, by Crystal Cascade to Hermit Lake in Tuckerman's Ravine, seven, and guide; February 15, Black Mountain, five; February 16, Carter Dome, six and guide; February 18, returned to Boston. The party was conducted by Mr. Ritchie. One of its members, Mr. Lawrence, proceeding to Randolph, made the following trips, accompanied by Mr. L. M. Watson: February 19, Ice Gulch and Randolph Mountain; February 20, King's Ravine; February 21, Mt. Adams, sleeping in the Club hut; February 22, Mt. Madison.

Thursday, May 30, a party of thirty-four left Boston for Charlestown, N. H., where they were joined by two others. The following trips were made in connection with this excursion: May 30, Beryl Mountain, thirty-six; May 31, Ascutney, thirty-three to base, twenty-four to summit; June 1, Prospect Hill, eighteen. The party returned to Boston by various trains. Mr. T. T. Woodruff and Mr. C. O. Webber conducted the party.

Saturday, June 15, a party of thirteen left Boston for the Southern Kearsarge, being joined at Concord by four and at the Winslow House by five more, making in all twenty-two. The following trips were made: June 15, Kearsarge, six; June 16, Kearsarge, eighteen, Cascades, seven; June 17, Lake Sunapee, seventeen; June 18, Kearsarge, two. The party was led by Mr. Ritchie.

The July field-meeting at the Profile House called together some seventy-three members and friends, the majority of whom left Boston on July 1. Tuesday, the 2d, the only completely fair day of the meeting, was utilized and enjoyed to the fullest extent, nearly all of the party in the forenoon making the ascent of Bald Mountain and a large majority ascending Profile (Cannon) Mountain in the afternoon. Of these, a small party descended directly from the stone face to the hotel. Wednesday forenoon was set apart for the presentation of papers. The afternoon being rainy, no excursions were undertaken. The same was true of Thursday forenoon; but as the afternoon was more promising, nearly the entire party visited the attractions in the vicinity of the Flume House. On Friday two parties were formed. The smaller, six in number with no ladies, started shortly after 7 o'clock for the summit of Mt. Garfield by way of Mt. Lafayette and the connecting ridge. Detained some four hours on the summit of Lafayette by dense clouds, it was nearly 2 o'clock before they started away from the north peak of this mountain, and about 5 o'clock when they arrived at their goal. Descending by the northerly slope of Mt. Garfield, they arrived at Bethlehem Junction at midnight, where they enjoyed a luncheon hospitably furnished by a resident farmer, Mr. Murchmore; proceeding from his house to the railroad, they followed it to the Profile House, arriving at about 3.30 A. M. The larger party, nineteen in number, made the ascent of Mt. Lafayette, the majority attaining the summit, the others tarrying on the spur near Eagle Lakes. On Saturday morning the party separated, many joining in the excursion to Dixville Notch. The committee in charge of the field-meeting consisted of Messrs. C. E. Fay, H. C. Francis, C. H. Hitchcock, W. S. Rumrill, and Miss Dora Williams.

Of the party at the Profile House, twenty-eight went by train to Lancaster on July 6, meeting there eleven who came direct from Boston the night before, with whom the journey was continued to Dixville Notch. The party tested to its limits the capacity of the Dix House. The following side trips were accomplished while at the Notch: July 7, Flume and Cascades thirty-eight, ten returning through the wilderness over Table Rock; in the afternoon, Sanguinari, fourteen; July 8, Table Rock, thirty-three; Profile, thirteen; July 9, Errol Dam, thirty-eight; July 10, Polmagenee, ten. The party returned to Boston on July 10 and 11. The committee consisted of President Pitman, Mr. Ritchie, and Mrs. A. F. Cutler.

A party led by Mr. Lawrence occupied Captain Barker's camp on Student Island, Lake Mooselocmaguntic, during the month of August. Thirty-one persons comprised the party, of whom twenty-eight were in camp at one time. The following trips were made in the Rangeley region during the camp: August 4, Bald Mountain, four persons; August 6, Deer, three; August 9, Bald, fifteen; August 12–13, Aziscohos; August 17, Observatory, sixteen; August 19–20, Saddleback, three; August 22–25, Parmachenee, fifteen; August 25, Aziscohos, thirteen; August 27, Bald, five; August 29–30, Kennebago, two; September 3, Bald, three. Members of the party stayed in camp for periods varying from one day to one month, arriving and leaving in small parties. The committee in charge consisted of Mr. Lawrence and Miss M. A. Knowles.

Thirty-four excursionists left the Boston and Albany Station on Saturday, August 31, for Holyoke, where Mr. Carney joined the party. After a dinner at the Holyoke House, nineteen were carried by barge to the foot of Mt. Tom, all of whom made the ascent of the West Peak. The proposed walk along the ridge to the hotel was given up for lack of time, and the party returned to Holyoke, going to Northampton by train. Here another member joined the company, which numbered altogether thirty-six. September 1 an informal party of thirty-two ascended to the summit of Mt. Holyoke, and the following day a company equally large participated in a drive to Amherst. The majority of the excursionists returned to Boston on September 2. The trip was conducted by Messrs. A. S. Parsons and J. W. Carney.

Of the party assembled at Northampton for the last-named excursion, thirteen left on Tuesday, September 3, for Chesterfield Hill, by railroad and wagon, arriving about noon. In the afternoon a walk in which eleven persons participated was taken across the country to the garnet bowlders. The morning of September 4 was devoted to a drive to the Caulkers, a series of sightly ledges overlooking the valley of the Westfield River, and the afternoon to a visit to Clark's Ledges, celebrated for their colored tourmalines. The following day a drive was taken along the banks of the Westfield River to Huntington, returning in the afternoon by the hill-top road. All the party attended all the drives. September 6, the company separated, — some to return to Boston, others to make further explorations of the hills. The leader of the party was Mr. Ritchie.

The Ashfield excursion called together thirty-three persons, mostly members of the Club, who left Boston on Wednesday, September 25, dining in Greenfield. The Ashfield House was the headquarters of the Club during the stay in the vicinity. The following programme of walks and drives was carried out: September 26 was rainy; September 27, Cummington and Bryant Place, thirty-one; September 28, South River Ravine (walk), twenty-five; afternoon, Peter's Hill and across the country to Ridge Hill (walk), fourteen; September 29, along Ridge Hill (walk), five; Peter's Hill (walk), nine; Briar Hill (walk), five; Hawley, eight; September 30, birthplace of Mary Lyon, twelve; afternoon, Chapel Falls and Briar Hill, eighteen; from Briar Hill to More's Hill and return (walk), seven; October 1, Briar Hill (walk), five; Conway, fourteen; October 2, Hawley and walk to Parker Hill, eleven. The party returned to Boston at different times, nine making the trip to West Deerfield and Whateley Glen on Thursday, October 3. The thanks of the party are especially due to Mrs. F. H. Dawes and her daughter for those courtesies which made the day spent at Bryant's home one long to be remembered by the Club. The party was conducted by Mr. Ritchie.

The outings have been continued during the year after the same general plan as heretofore, being under the care of a sub-committee consisting of Messrs. Chubbuck, Woodruff, and Parsons. Thirty-eight Saturdays were provided for, three of which proved so stormy as to warrant the omission of the outing. A new feature, the "long walk," has been introduced by the committee, the object of which is to make familiar to members the country distant from roads and railroads. The first of these was over the summits of the Blue Hill Range from East Quincy to Great Blue Hill, a distance of nine miles through exceedingly rough country. Fifty-three persons, of whom nine were ladies, participated in this walk. The second "long walk," over the entire length of Bow Ridge in Lynn, was attended by sixteen Club members.

During the year the section for Field Study occupied two Saturdays. No opportunity was afforded for snowshoe walking in the vicinity of Boston.

Among trips near Boston requiring more than a half-day, were a visit to Rockport on April 30, in which seventy-six participated; the customary May walk, an enjoyable ramble in the Lynn Wood Park, attended by forty-four; a fall trip to the Wayside Inn on November 16, by sixty-nine persons. One of the field studies at Dogtown Common also required an open-air luncheon.

A few statistics may be worth recording. The nine excursions were attended by 246 members and 48 friends; in all 294, an average of 33. The thirty-seven outings were attended by 887 members and 155 friends; in all 1,042, an average of 28. The attendance of ladies on the excursions has been slightly more than of men; on the outings the reverse was true. 233 different members of the Club participated in outings or excursions. 20 members attended more than ten outings; 68 from three to ten; and 91, less than three. The excursions of the year have been chiefly to little-frequented places, three of the parties testing to their fullest extent the facilities of the town for entertainment.

JOHN RITCHIE, JR.,
I. Y. CHUBBUCK,
T. T. WOODRUFF,
A. S. PARSONS,
MISS DORA WILLIAMS,
Excursion Committee.

Proceedings of the Club.

June 12, 1889 (Evening). — One Hundred and Third Corporate Meeting.
President Pitman in the chair.

One hundred persons were present. Thirty-six candidates for membership, nominated at the last meeting, or upon the call for this meeting in accordance with the new By-Law, were elected.

Rev. E. F. Merriam gave an account of his visit to Mammoth Cave, illustrating his remarks with fourteen stereopticon views of the halls, passages, and formations in the cave.

Mr. George H. Barton described the cruise of the "Arethusa" on the west coast of Newfoundland. This was a trip undertaken for scientific purposes, and especially the collection of fossils, by Professor Alpheus Hyatt, of the Boston Natural History Society. Mr. Barton described the voyage, which included one very severe storm, and narrated many interesting incidents attending the work of the party. Forty-one lantern views were shown illustrating the rugged scenery of the coast, islands, promontories, and mountains.

June 29–July 6, 1889. — Twenty-fourth Field Meeting.

Held at the Profile House, White Mountains, N. H.

On Wednesday morning, July 3, a meeting was held in the hotel parlor. Mr. W. G. Nowell was elected chairman, and Mr. J. Ritchie, Jr., secretary *pro tem*. Seventy-four persons were in attendance.

Letters of regret were read from Professor C. H. Hitchcock and Rev. H. P. Nichols; accompanying the former were interesting statements with reference to Dixville Notch, while the latter contained an account of the ascent of the Giant Stairs from North Conway. (See p. 94.)

A paper entitled "Chaucer's Sentiment of Nature; its Reproduction in American Poets," by Mr. H. W. Whittemore, was read by the Rev. J. W. Carney. (See p. 46.)

Mr. H. C. Francis spoke in a somewhat humorous way of recent canoeing-trips taken by him on the Delaware and Susquehanna Rivers.

October 9, 1889. — One Hundred and Fourth Corporate Meeting.

Vice-President Jones in the chair.

One hundred and ten persons were present. Thirty-seven candidates for membership were elected.

Professor W. O. Crosby described the great bowlder at Madison, N. H., — a very impressive and instructive example of glacial transportation. (See p. 34.) Twenty photographic views of the bowlder, the parent ledge, and the neighboring mountains were exhibited.

Rev. Edward Everett Hale, who had recently seen the bowlder, compared it to an old ship with bow gone and lying on her side. He said the road to it was nearly completed, and the people in the vicinity were much exercised lest it should be quarried into pieces. He had been requested to tell this to the Club.

The Recording Secretary stated that the Council had the matter under consideration.

Miss Elizabeth Hardwick read a paper prepared by herself and Miss Ellen L. Sampson, entitled "A Canoe Trip down the West Branch of the Penobscot." (See p. 61.)

November 11, 1889. — One Hundred and Fifth Corporate Meeting.

Vice-President Jones in the chair.

Eighty-five persons were present. Twelve candidates for membership were elected.

A paper by Mr. C. W. M. Black, of Washington, entitled "Stony-Man Mountain, the Pride of the Blue Ridge," was read by Mr. J. Ritchie, Jr. The reader first described the topography of Virginia, including the leading mountain-ranges. Stony-Man is situated near Luray, and is 4,030 feet above tide. The paper gave a description of the mountain, the views it commands, and the attractions of the region.

Mr. Frank O. Carpenter presented a paper entitled "The Great Smoky Mountains and Thunderhead Peak." The range of the Smoky Mountains separates North Carolina from Tennessee, and the Great Smokies are the culmination. Thunderhead Peak (not however the highest) is 5,520 feet. The paper described the trip from Maryville, the beautiful pastures on the summit of the ridge, the grand view of mountains, and a severe midnight thunderstorm in camp.

Notice was given of the meeting of the Snow-Shoe Section, Friday, November 15, at Club Room, and of an excursion to Wayside Inn and Nobscot Hill, November 16.

December 9, 1889. — One Hundred and Sixth Corporate Meeting.

President Pitman in the chair.

One hundred persons were present. Six candidates for membership were elected.

It was voted to request the President to appoint a committee to nominate officers for the coming year, another to audit the books of the Treasurer, and a third to arrange for the annual reception. At the close of the meeting the President announced the following appointments: —

Reception Committee, — T. W. Higginson, Walter R. Davis, William S. Rumrill, Miss M. A. Knowles, Mrs. J. H. Thorndike, Miss Ellen L. Sampson, and Miss Lucy A. Putnam. Nominating Committee, — A. E. Scott, John Herbert, Alexander Moore, Miss M. E. Hardwick, and Miss M. A. J. Frothingham. Auditing Committee, — Harry H. Barrett and A. S. Lynde.

The subject of the evening was the Rangeley Lake Camping-trip in August, 1889. Under the supervision of Miss Julia C. Clarke, several short papers had been prepared by different members of the party. Miss Clarke opened the subject with some general remarks concerning the excursion and the arrangement of the papers, which was as follows: "Phillips and Mount Blue," by Mr. H. H. Barrett, read by Mr. J. Ritchie, Jr.; "The Geography of the Rangeley Region, with special Reference to the Lakes and Mountains visited," by Mr. R. B. Lawrence; "Captain Barker's Camps," by Miss Clarke; "Camp Life on Spirit Island," by Miss Vida H. Francis; "A Trip to Lake Kennebago," by Mr. Lawrence; "Bald Mountain, its Flowers and Mosses, and the Fine Views from its Summit," by Miss Agnes W. Lincoln; "The Excursion to the Richardson Ponds and Mount Observatory," by Mr. William H. Ladd; "The Ascent of Aziscohos Mountain," by Miss M. A. J. Frothingham; "A Climb up Saddleback Mountain," by Mr. Lawrence; "The Attractions of Lake Parmachenee," by Miss L. A. Putnam; "The Trip down the Magalloway River and over Aziscohos Mountain," by Miss S. M. Daniell; "Some Botanical Notes," by Miss M. E. Lathrop, read by President Pitman. Miss Clarke said a few words concerning the Cupsuptic River, the fungi found on the island where the camp was situated, the birthday party celebrated around the wigwam camp-fire, and the interesting and instructive talk upon Iceland, — its scenery, language, and literature, — given them by Professor Charles Sprague Smith, of Columbia College. Mr. Lawrence added a short account of an ascent of Bald Pate Mountain; and the series of papers was closed by Mr. Ritchie with a description of Andover and the departure from the Lakes.

January 8, 1890. — One Hundred and Seventh Corporate (Annual) Meeting.

President Pitman in the chair.

Eighty-five persons were present.

The reports of the five Councillors were presented, showing the work done in the different departments during the year 1889.

The report in detail of the Excursion Committee for 1889 was presented by the chairman, Mr. J. Ritchie, Jr. (See p. 96.)

The Recording Secretary called attention to the new map of Massachusetts, issued by the State Commissioners, a copy loaned by Mr. Samuel H. Scudder being on exhibition. Nineteen photographs taken with a "Kodak" from a moving train in the Black Cañon of the Gunnison, Colorado, presented to the Club by Mr. Scudder, were also exhibited.

It was then voted to ratify the action of the Council in appropriating to the Permanent Fund all interest accumulated on said fund to time of last payment of interest on the investment.

The annual reports of the Recording and Corresponding Secretaries, Treasurer, Trustees, and Auditors were presented and accepted. (See pp. 77-87.)

The resignation of Mr. Charles W. Kennard as a Trustee was presented and accepted.

Hon. A. E. Scott, Chairman of the Committee on Nominations, presented the following list: President, George C. Mann; Vice-President, Percival Lowell; Recording Secretary, Rosewell B. Lawrence; Corresponding Secretary, Frank W. Freeborn; Treasurer, John E. Alden; Councillors: Natural History, Miss Julia C. Clarke; Topography, Charles Eliot; Art, John Ritchie, Jr.; Exploration, Lucius L. Hubbard; Improvements, Frederic D. Allen; Trustees of the Permanent Fund: for three years, William H. Niles; for one year, Robert C. Pitman.

The balloting for officers resulted in the unanimous election of those nominated, fifty-nine ballots being cast.

During the balloting President Pitman, as chairman of a Committee of the Council to investigate the question of the Club's ability to hold real estate in New Hampshire, reported that the Club undoubtedly had such right.

President Pitman appointed A. E. Scott, E. C. Eastman, and R. F. Curtis members of a Committee, authorized by the Council, to take all necessary and practicable measures to forward the work of the New Hampshire Commission for the Preservation of Forests.

The President-elect, Mr. George C. Mann, then assumed the chair.

Mr. Warren Upham presented a paper entitled "A Recent Visit to Lake Itasca." Many geographical and geological features of the region were clearly described, and a large map of Minnesota was exhibited.

Rev. E. F. Merriam gave an account of his ascent of the Parlin Pond Bald Mountain, Maine. The view of the Moosehead Lake Mountains and Ktaadn to the east, and the Rangeley Lake Mountains to the southwest, was very interesting.

February 14, 1890. — One Hundred and Eighth Corporate Meeting.

President Mann in the chair.

One hundred and forty-five persons were present. Ten candidates for membership were elected.

Information was given concerning the recently issued "Map of the Country about Boston," published by the Club from the proofs of the State Map, with the permission of the Director of the United States Geological Survey and the Commissioners of the Topographic Survey of Massachusetts. Copies of this map have been sent to all members of the Club with the call for this meeting.

Notice was given that the interesting collection of photographs, sixteen hundred in number, exhibited at the annual reception at the Hotel Vendome, February 7, were now on exhibition for four days in the room adjoining the Club Room at 9 Park Street.

Mr. Frederick H. Chapin presented a paper on "The Cliff-Dwellings of the Mancos Cañons." (See p. 12.) The paper was finely illustrated by eighty stereopticon views taken by himself, that of "The Palace" being specially striking and beautiful.

March 12, 1890. — One Hundred and Ninth Corporate Meeting.

President Mann in the chair.

One hundred persons were present. Ten candidates for membership were elected.

Professor C. E Fay gave an account of "A Visit to the Adirondacks of the North: the Sources of the Saguenay." The region resembles the Adirondacks of New York in its lakes rather than in its mountains. Lake St. John, and among the many smaller ones Lake St. Joseph and Lake Edward, were specially described. Many interesting characteristics of the French Canadian people were mentioned. The passage down the Saguenay rapids in a canoe proved exciting, while the scenery on the fjord below was very grand.

Professor W. M. Davis addressed the Club concerning "The Old Mountains of Pennsylvania." The characteristics of these mountains — the absence of peaks, the long flat ridges, the tilting of the axis, the zigzags and serrations — were explained by the following theory, — that the country was once at a lower level; after its mountains had been worn down, the whole region was lifted; and subsequently the soft rocks had been etched out.

Professor W. H. Niles exhibited some fine photographs of Swiss scenery, the work of the late W. F. Donkin.

April 9, 1890. — One Hundred and Tenth Corporate Meeting.
President Mann in the chair.

Eighty persons were present. Nine candidates for membership were elected.

Mr. S. H. Scudder addressed the Club concerning the Map of the Country about Boston. He explained the joint work done in Massachusetts by the United States Geological Survey and the Topographic Survey of the State, and of the arrangements by which the Club has been enabled to publish this map in advance of the completion of the Government work throughout the State. Mr. Mann exhibited a copy of the map colored so as to show difference in elevation.

Professor W. O. Crosby exhibited lantern views of the bowlder at Madison, N. H., and of Mohegan Rock at Montville, Conn. In his opinion Mohegan Rock is not a bowlder, but a ledge; he showed that it is inferior to the Madison bowlder in size as well as solidity. (See pp. 67–70.)

Mr. R. B. Lawrence gave an account of the winter excursion to Randolph, N. H., Feb. 26–March 6, 1890, including a visit to King's Ravine, an ascent of Mt. Adams, and a night at the Madison-Spring Hut. Ladies participated in all the features of the trip. Lantern views, from the plates of a No. 2 Kodak camera, were exhibited, showing the Club Hut, and Mts. Madison and Adams as seen from the Ravine House and Randolph Hill.

Officers for 1890.

President.

George C. Mann, Jamaica Plain.

Vice-President.

Percival Lowell, 40 Water Street, Boston.

Recording Secretary.

Rosewell B. Lawrence, 23 Court Street, Room 409, Boston.

Corresponding Secretary.

Frank W. Freeborn, 9 Park Street, Room 17, Boston.

Treasurer.

John E. Alden, 18 Post Office Square, Boston.

Councillors.

Natural History, Julia C. Clarke, 505 Columbus Avenue, Boston.
Topography, Charles Eliot, 50 State Street, Boston.
Art, John Ritchie, Jr., Box 2725, Boston.
Exploration, Lucius L. Hubbard, 21 Craigie Street, Cambridge.
Improvements, Frederic D. Allen, Cambridge.

Trustees of the Permanent Fund.

William H. Niles. Rest F. Curtis.
Robert C. Pitman.

Members added since May, 1889.

CORPORATE MEMBERS.

ALDERSON, WILLIAM C.
Allen, Edward E.
Ames, Miss Sarah W.
Atherton, Edward H.
Atwood, William P.

Barnes, Lemuel C.
Batchelder, John L., Jr.
Bayley, Miss Elizabeth S.
Bowdlear, Mrs. William A.

Carney, James W.
Carson, Mrs. H. A.
Chace, Mason S.
Chamberlain, Mellen.
Chase, Philip A.
Chase, Mrs. Philip A.
Claflin, Waldo M.
Clement, Miss Florence.
Codman, Mrs. Abbie F. T.
Coe, Miss Mary Alma.
Cushing, Miss Lillie H.
Cutter, Mrs. C. K.
Cutter, Louis Fayerweather.

Davidson, Herbert E.
Decrow, Miss Gertrude
Denio, Miss Elizabeth H.
Draper, Thomas B.
Draper, Mrs. Thomas B.
Driggs, Edmund H.
Driggs, Mrs. Emily L.
Dusseault, William F.

Eastman, Mrs. Edson C.
Eastman, Ermon D.
Endicott, Miss Charlotte M.
Evans, Miss Jeannie.

Fall, George H.
Ferguson, Robert G., Jr.
Folsom, Miss Anna Abbot.
Frazar, Miss Kate.
French, Charles H.

Gilkey, Miss M. Louise.
Gill, Miss M. E.

Hall, Herbert James.
Hall, Newton M.
Hardwick, Mrs. C. H.
HARRIS, T. W.
Harrison, J. B.
Hawes, Mrs. R. L.
Haworth, A. D.
Hayes, Miss Alice.
Hayes, Miss Ellen A.
Heald, Simpson C.
Heald, Mrs. S. C.
Heyer, Miss Marie W.
Hinckley, Mrs. David F.
Hubbard, Mrs. Lucius L.
Hunt, W. S.
Huntington, Miss Grace.
Hutchins, Miss Amy.

Irish, Cyrus W.

Jordan, Miss Ella C.
Jordan, Miss Emily F.
Jordan, Miss Sarah A.

Kennard, William H.

Lathrop, Miss Mary E.
Livermore, Mrs. M. A. C.
Loud, Mrs. M. E.

Mansfield, Ezra Abbot.
Mansfield, Mrs. Ezra Abbot.

Newhall, Charles H.
Newhall, Elbridge K.

Nichols, J. Howard.
Nickerson, Augustus.

Osborne, John B.
Otis, Mrs. Emma A.

Parsons, Mrs. Albert S.
Parsons, Miss Elizabeth.
Parsons, Percy G.
Peabody, W. E.
Peabody, Mrs. W. E.
Peirce, Miss M. E.
Pond, Quincy.
Potter, Miss Mary Goddard.
Prichard, Frank P.

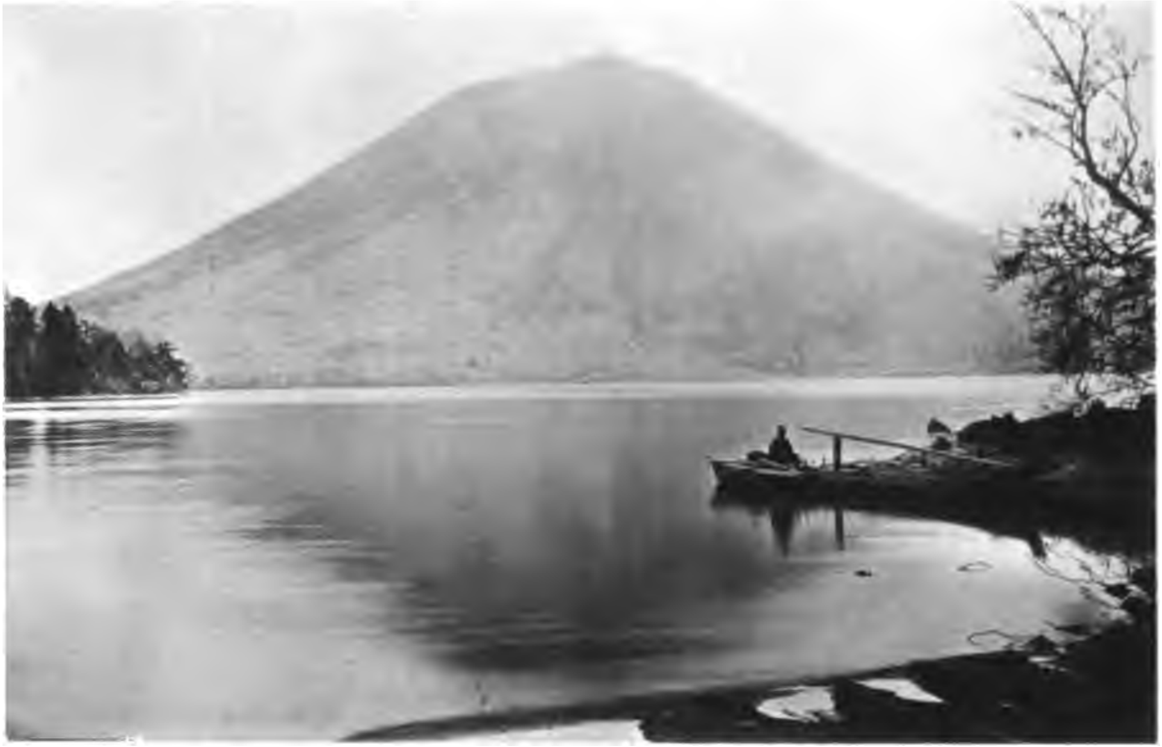
Reed, Alan H.
Richards, William S.
Robson, John.
Robson, Louis E. K.

Shepard, Harvey N.
Smith, Miss Alice T.
Smith, Hamilton I.
Smith, Mrs. H. I.
Smith, Henry M.
Starbird, N. W.
Stevens, Mrs. George M.
Stevens, Joseph L.
Swan, Mrs. A. E.
Swan, James.
Sweet, Henry N.

Talbot, Mrs. C. H.
Teele, J. Merle.
Thatcher, Miss Susie E.
Tilton, J. O.
Tripp, Mrs. S. D.

Vaughan, Francis W.

Wetherbee, Albion O.
Wilde, Albion D.
Wing, Mitchell.



BOSTON PHOTOGRAVURE COMPANY.

NANTAI-SAN AND CHIU-SEN-JI LAKE.

From a Photograph by Farsari, Yokohama.

APPALACHIA.

VOL. VI. BOSTON, DECEMBER, 1890. No. 2.

Ascent of the Volcanoes Nantai-san, Asama-yama, and Nasu-take.

BY W. J. HOLLAND,

Naturalist of the U. S. Eclipse Expedition to Japan, 1887.

Read July 1, 1890.

THE long chain of islands composing the Japanese Empire, stretching from Hateruma-shima, the southernmost of the Riukiu group, in Lat. 24° 10′ N. and Long. 123° 40′ E., to Shumshu, the northernmost of the Kurile group, in Lat. 51° 10′ N. and Long. 157° 6′ E., gives evidence throughout its entire extent of the activity, at earlier or later periods, of volcanic forces. The great central islands and the Kuriles abound in hills and mountains which are plainly of volcanic origin, — some of them broken down volcanic peaks; others well developed volcanic cones, the fires in which are apparently extinct; others still active, emitting steam and smoke, and from time to time bursting forth into more violent eruptions. Professor Milne, in his valuable paper upon the volcanoes of Japan, published in the ninth volume of the "Transactions of the Seismological Society of Japan," enumerates one hundred and twenty-nine mountains within the limits of the Empire which are "easily recognizable as being of volcanic origin," and states that of this number fifty-one are still active, as is shown by the constant emission of steam, or steam mingled with the fumes of sulphur. The largest proportion of regularly formed cones and active volcanoes is found in the long and narrow chain of the Kuriles; and Mr. Milne hence argues, with apparent reason, that the mountains in the north are of more recent origin than those in the south.

As yet the mountains of Japan have been only partially explored by geologists, and it is highly probable that the result of a more thorough investigation will be to add to the number of peaks which must be recognized as of volcanic origin.

I. Nantai-san.

The great central mountain-ranges of the main island contain a large number of volcanic peaks, among the more easily accessible of which is Nantai-san. Having been requested by Prof. D. P. Todd, of the United States Eclipse Expedition, to ascertain definitely whether the summit of this mountain could be advantageously employed as a site for a party of astronomical observers, I undertook the ascent of the peak, and separated for this purpose from Professor Todd and Lieutenant Southerland at Nikko, taking with me Dr. W. N. Whitney, the learned and amiable interpreter of the United States Legation, whose services our Minister Plenipotentiary, Hon. R. B. Hubbard, had kindly placed at the disposal of the expedition. Mrs. Whitney, who was spending a few days at Nikko, consented to accompany us upon our pedestrian tour as far as Chiu-sen-ji.

We left Nikko early upon the morning of Monday, July 18. Mrs. Whitney was attended by a party of bearers, who carried a *kago*, which was brought into requisition at the muddy places in the road, which were by no means infrequent. Our path led us through the beautiful garden of Dai-nichi-do, its hedgerows of azaleas a mass of flaming bloom, over which hovered magnificent specimens of Papilio DeHaanii and Papilio Demetrius, while around a small willow a score or more of the beautiful Apatura Clytie were darting about. The work of making entomological collections was, however, destined to be sadly interfered with by the rains, which continued to fall more or less throughout the day, until evening. Our advance was made by fits and starts between showers, from which a ready shelter was generally found in the tea-houses and inns by the wayside. At the large tea-house at Mma-gayeshi we stopped long enough to get our lunch, adding to the viands we had brought with us a fine trout, which had just been taken from the boiling rapids of the Daiya-gawa by a native fisherman, and which our landlord kindly had prepared for us *à la japonaise.*

From Mma-gayeshi the scenery became wildly grand, the path leading through a savage gorge, at the bottom of which the Daiya-gawa, swollen by the constant rains, roared and foamed downward toward the valley we had left behind us. The stream is crossed in a dozen places by primitive bridges made of poles and fagots, which gave warning that it would be highly imprudent to test their strength to any great degree. A brisk walk of about half an hour brought us to the head of the gorge; and then came a long and steep ascent to the top of a narrow ridge, where the winds kindly favored us by parting the clouds, and allowing the sun in its afternoon glory to flood the world below us and around us. We halted to drink in the full loveliness of the scene. Above us was the azure sky; around us lofty hill-tops covered with verdant growths of bamboo grass, rough and impassable enough in reality, but in the distance appearing smooth and well kept as an English lawn. At the head of the ravine which rises to the right of the hill-top and penetrates the flank of the great volcano, the eye is charmed by the spectacle of two great cascades, the Hannia-no-taki and the Ho-do-no-taki, pouring like streams of molten silver over beds of vermilion-red lava into the green abysses of the forest at their feet. Refreshed by sundry drinks of tea (*o-cha,* the honorable tea, which is everywhere tendered the traveller in Japan), we made the ascent of the latter part of the pass. With a sigh of relief we reached the top, and found ourselves in the midst of a forest of noble oaks, the branches of which are covered with long festoons and streamers of the Saru-gase (Lycopodium Sieboldii), recalling the "long moss" of the Florida live-oaks. A short detour to the left brought us to the brink of the deep gorge through which the cascade known as Kegon-no-taki makes its plunge. This is one of the finest cascades in Japan.

It is about three hundred and fifty feet in height; and before the water reaches the bottom a large part of it is converted into spray, which is driven upward by the rising currents of air, and is spanned, as it emerges from the black and yawning gulf, by innumerable rainbows, which appear and disappear in constant succession. Hundreds of cliff-swallows were soaring about over the spot; and as they swept down into the black abyss, the sunlight sparkling on their wings gave them the appearance of living gems.

Leaving my comrades to find their way to the village of Chiu-sen-ji, I busied myself, as I slowly followed them, in collecting the floral and faunal treasures of the spot. Even at the high altitude of Chiu-sen-ji Lake (4,375 feet above sea-level) the remarkable combination of forms which is characteristic of the flora and fauna of Japan is to be observed. The mingling of Asiatic and European and American genera is one of the most striking features of the country; and the student is delighted as well as surprised to find bamboos and beeches, Canada cornels and camellias growing on the same mountain-side, and robin-redbreasts and monkeys playing about in the same thickets. The fields and shady recesses of the woodlands around Chiu-sen-ji yielded me a rich harvest of entomological specimens during the hours I worked them; and many species turned up here which I did not encounter anywhere else during my stay in Japan, though they doubtless are abundant in other localities. Among the most interesting captures were a number of specimens of that singularly pretty little day-flying moth, known as Pterodecta gloriosa, which in its flight as well as form and coloring mimics the members of the genus Chrysophanus. It occurred in considerable numbers, flitting about on the low herbage and frequenting flowers, sitting upon the petals and exploring the depths of the honey-bearing species with its wings erect, as they are carried by the rhopalocerous insects. As night came on, I rejoined my friends at the Suzuki-ya, one of the two best inns in the village of Chiu-sen-ji, which strangely enough is for the most part uninhabited except in the months of July and August, when it is resorted to by religious pilgrims bent upon the ascent of Nantai-san. In this respect the town may be likened to a Methodist camp-meeting resort. We were delighted to find under the roof of the Japanese inn our friends, the Rev. Messrs. Soper and Imbrie, of Tokyo, with their families. Thanks to the kind mediation of Dr. Whitney, an excellent supper in European style had been gotten ready in anticipation of my arrival at the inn, and after the exertions of the day it proved most appetizing.

At two o'clock upon the morning of the next day, July 19, the writer, accompanied by Dr. Whitney and the Rev. Messrs. Soper and Imbrie, commenced the ascent of Nantai-san. The first step was to rouse one of the priests of the Buddhist temple at the edge of the village from his slumbers, and get him to open for us the heavy wooden door which marks the entrance of the path by which pilgrims reach the summit. Nantai-san is sacred, as are all the high mountains of Japan, and is annually resorted to in midsummer by thousands of pilgrims who come from different parts of the Empire to worship upon the top. The night was intensely dark. Each of the company and the two coolies whom we took with us as guides and porters, were furnished with paper lanterns. The priest, in answer to the calls of Dr. Whitney, came forth hurriedly, conducted us across the temple area, prostrated himself upon the pavement before the gate, ejaculated a prayer to Buddha, invoking safety upon our party, and then unbarred the doors. We rapidly filed through, and found ourselves upon a steep path overhung by great trees and bordered by a tall growth of shrubs and bamboo grass, every leaf of which was burdened by the drops which had been left by the showers of the night.

The ascent is very steep. The path is traced in a straight line from the temple to the summit, with no attempt to mitigate the difficulty of the climb by judicious detours to the right or to the left. This is no doubt intentionally done by the ecclesiastical engineers in charge of the mountain, whose design is to increase the religious merit of the ascent by making it as arduous as possible. The dense growth of trees and the tangle of low bamboos which cover the mountain from the foot almost to the summit, preclude any attempt on the part of the tourist to choose a more devious but less exhausting path than that marked out.

The summit was reached shortly before seven o'clock, unfortunately too late for the sunrise. The view from the mountain-top richly repaid the fatigues of the ascent. The morning was warm; the air was perfectly calm. To the east the broad plain of the Kwanto stretched away to the horizon, traversed by rivers which shone in the light like bands of silver. On the far southern horizon the cone of Fuji-san rose, a wedge of purple wreathed in sunlit mists. On the southwest and west great mountains in serried ranks towered one above another; conspicuous among them Asama-yama with its plume of smoke. In the valleys great masses of white clouds slumbered, awaiting the touch of the morning breezes to raise them from their lairs. At the foot of the mountain Chiu-sen-ji Lake was revealed, an emerald set in the deeper green of the wooded hills. At the western end of the lake, Shirane-san loomed up grandly in the middle distance, its summit scarred and broken by the eruption of 1872; while to the northwest and north a sea of peaks, some of them still partly covered with snow, stretched away toward the western sea until they were lost in the dark clouds which presaged the coming of a storm. Near at hand upon the north, plainly linked at their base to the summit on which we stood, were the great mountains known as O-manago, Ko-manago, and Nio-ho-zan.

The study of the configuration of the country which I was able to make from the vantage-ground of the mountain-top confirmed the impression which had been steadily deepening in my mind since leaving the line of the railway at Utsonomiya, that there must have existed in prehistoric times a centre of tremendous volcanic energy, in the region of which Chiu-sen-ji Lake is the focus. Shortly after leaving Utsonomiya upon the high-road to Imaichi and Nikko, at a distance of fully twenty miles from the latter place, my attention was attracted to the fact that beneath the thick deposit of vegetable mould, varying in depth from two to three feet, in which giant cryptomerias, many of them from four to six feet in diameter, have taken root, there was a deposit of volcanic ejectamenta. This deposit, which appears in the cuttings through which the road passes, gradually increases in depth as Imaichi is approached, and reveals an upper stratum of yellowish white pumice and a lower stratum of a deep red color which is no doubt due to the oxidization of iron. The pieces of pumice vary from the size of a filbert to that of a walnut. The great size of the trees and the depth of the vegetable mould superimposed upon the volcanic strata indicate that they must have been thrown out at an historically remote period. In fact, there is no record, so far as we are aware, in the large body of Japanese literature relating to volcanoes, which recites an eruption in this region of sufficient magnitude to have led to the deposit of such heavy strata of ashes at so great a distance from the centre of eruption. The difference in color which exists between the upper and lower beds undoubtedly points to two or more eruptions at different times.

After leaving Nikko, as the traveller passes on toward Chiu-sen-ji and enters the gorge of the Daiya-gawa, the deposit of volcanic ashes and scoriæ is found in places to be several hundred feet in depth. The cascades known as Hannia-no-taki and Ho-do-no-taki, which form so charming a feature in the landscape visible from the top of the steep hill above Mma-gayeshi, have cut down through these strata of ashes to the depth of fully one hundred feet. Interspersed among the beds of pumice and scoriæ are angular fragments of andesitic rock, varying in size from a marble to pieces two or three feet in diameter. These pieces possess the same constitution as the great masses of andesite which broadly underlie the beds of volcanic ejectamenta. Their location reveals that with the ashes in which they are imbedded they must have been hurled out from the central crater, the proximity of which is indicated by the ever increasing depth of the beds of volcanic debris. The best exposure of the strata occurs at the Kegon Falls. The section of the mountain here laid bare reveals that superincumbent upon the masses of andesite and basaltic rock which form the bottom of the gorge is a deposit of fragments of rock and scoriæ over one hundred feet in thickness; and on top of this to the depth of fully two hundred feet lies a mass of rock of volcanic origin, the broken surface of which is full of sharp and splintering projections. A number of small rills issue from the lower bed of materials, and unite their waters with the main cataract, which falls a mass of feathery foam upon the hard bottom of the ravine. The presence of these streams gushing from the substratum of volcanic ejectamenta may possibly indicate that a portion of the waters of the lake finds an outlet through this deeper deposit of ashes and comminuted stones. Owing to the loose and friable character of the lower stratum, it has been more rapidly eroded; and the superincumbent mass of rock over which the larger fall flows, projects after the manner of a table-rock (Fig. 1).

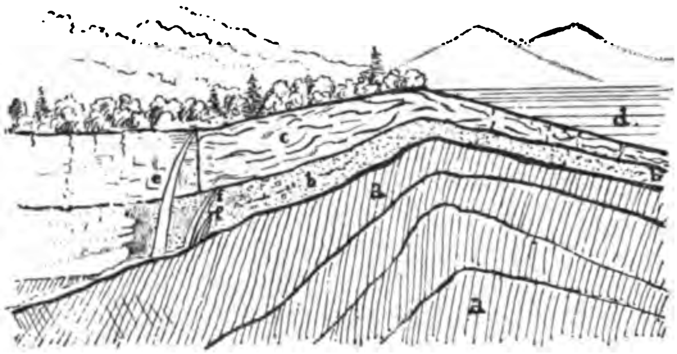


Fig. 1. Ideal Section of Rocks of Kegon-no-taki.

a. Andesite. b. Scoriæ. c. Trachyte. d. Chiu-sen-ji Lake, 4,375 feet above sea-level. e. Kegon Fall, 350 feet in height. f, f. Cascades issuing from lower stratum of scoriæ.

Chiu-sen-ji Lake is a beautiful sheet of water, about seven and a half miles in length and at its broadest part about two and a half miles wide. Its outline is irregular. On its southern margin a very narrow promontory, about a third of a mile in length, juts out into the water, and a smaller promontory appears upon the northern side near the western end. Shirane-san, which is still intermittently active, and at the base of which are the famous hot springs (Yumoto), rises nearly 4,500 feet above the level of the lake, or to a height of about 8,800 feet above sea-level. Nantai-san upon the northern side (Pl. VI.), a well formed volcanic cone, has an elevation of a little less than 4,000 feet above the lake, or of about 8,375 feet above sea-level. Ko-manago, and Nio-ho-zan, to the north, are connected peaks, which at a former time probably formed portions of the walls of a crater which has been broken down. In this judgment I am happy to know that Dr. E. Knipping, who is familiar with the spot, agrees with me.

Of Nantai-san Mr. Milne remarks (Trans. Seism. soc. Japan, vol. ix. p. 112) that "although it has a well-defined volcanic form, all traces of a crater at its summit have been obliterated." I cannot agree with my learned friend in this opinion. The summit of Nantai-san is a segment of an irregular circle, the northwestern half of which is lacking. It is quite evident to my mind that at one time there was a well defined crater at the top, and that the northwestern wall of the crater has been broken down, and the greater part of the contents of the old crater swept by the rains down into the Aka-numa-ga-hara, or "Moor of the red swamps." There are many dikes of red lava which form well defined ridges about the semi-circular remnant of the ancient crater; and the inner surface, which descends with extreme abruptness, consists of water-worn glissades of volcanic ash and white kaolin, such as is found about the solfataras at Nasu-take and elsewhere, derived from the alteration of lava by acids. So far from there being no trace of a crater upon the summit, there are the well marked ruins of such a structure, to the form of which the geologically untrained eyes of my comrades upon the occasion of our ascent were at once attracted, and in reference to which, before I ventured any comment, they began to speak. I cannot but conclude that Mr. Milne has based his remarks upon the summit of Nantai-san upon information derived from others, rather than upon a personal inspection of the locality.

The study of all these phenomena which I have sketched has led me to several conclusions. I am quite convinced, from the hasty study of the neighborhood which I was able to make in the limited time given me, that the original centre of the volcanic disturbances of this region is to be found in the depression in which Chiu-sen-ji Lake rests. In fact, this opening on the mountain at a level of 4,375 feet above the sea now filled with waters, was once filled with fires, and hence issued the beds of volcanic ashes which are distributed to the east and to the north to a distance of from twenty-five to thirty-five miles. The mountain of which O-manago and Nio-ho-zan are peaks, was a collateral and possibly subsequent centre of volcanic disturbance, and so also Nantai-san and Shirane-san. In the two former the fires long ago became extinct; in the latter they still slumber and occasionally break forth, as they did in 1872, when an eruption of some magnitude occurred, and as has again occurred in the present year, 1890. These three noble mountains stand, in fact, related to the great central mass upon which they rest as the monticules upon Etna stand related to its larger bulk.

Before concluding these brief notes upon Nantai-san I cannot refrain from a passing allusion to the flora of the summit. While not in any sense alpine, it is separated widely from that of the plain to the eastward, and widely from the region about Lake Chiu-sen-ji, at its immediate foot, and reveals remarkable affinities to the flora of the Alleghanies. It was a delight, after having passed through the rice-lands of the plain and their semi-tropical growths, to recognize here upon the mountain-top such familiar old friends as Alnus viridis and Cornus Canadensis in bloom.

II. Asama-yama.

My ascent of Nantai-san had revived within me the love of mountain climbing, and the sight of the great plume of smoke which forever hangs over the summit of Asama-yama had begotten within me a longing to scale its majestic summit. I was further impelled to visit the locality by the knowledge derived from Mr. Henry Pryer, that the flora and insect fauna of the province of Shin-shiu differ very materially from the flora and fauna of the eastern sea-coast provinces. Accordingly, upon my return to Tokyo I immediately made preparations to return to the mountains. Accompanied by

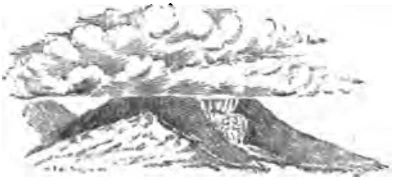


Fig. 2. Asama-yama,
As seen at 3 P. M., July 30, 1887, from Oiwake.

Tora-san, an intelligent Japanese residing in Yokohama who had been recommended to me as a competent native collector, I left the capital on the morning of July 28, and went by rail to Yokogawa, the western terminus of the Takasaki-Yokogawa Railway, at the foot of the Usui Pass.

The scenery in the vicinity of Yokogawa is surpassingly beautiful, the strange volcanic range of which Miogi-san is the highest peak being a conspicuous feature in the landscape. From Yokogawa the ascent of the Usui Pass is made by a well constructed road until the summit is reached, at a level of about 2,500 feet above the sea. From the summit the traveller proceeds by the highway of travel through central Japan, known as the Naka-sen-do. The cuttings by the roadside show that the formation of the entire region is volcanic, and the hills are composed almost entirely of trachytic rock overlaid with deposits of tufa and volcanic scoriæ. We were detained by a violent thunder-shower which enveloped the pass at sunset; but later the moon shone forth, and we proceeded as far as Tsukake, where we passed the night. Upon the following morning, having sent our luggage forward, we walked to Oiwake, botanizing and entomologizing by the way. Asama-yama rises to the north of the Naka-sen-do, and presents an

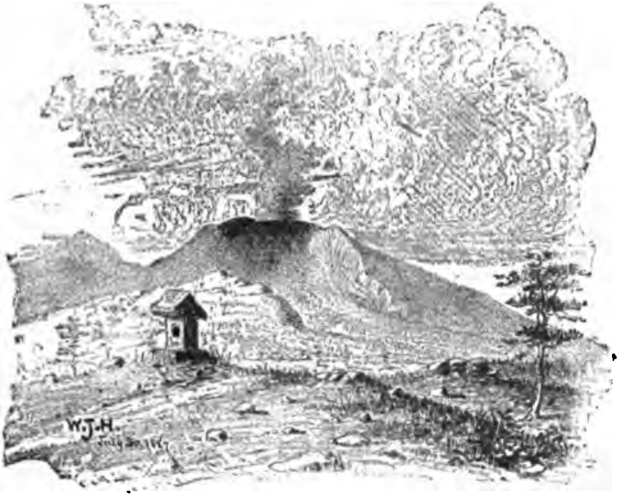


FIG. 3. ASAMA-YAMA, AS SEEN AT 7 P.M., JULY 30, 1887, FROM OIWAKE.

imposing appearance from every point of view. Its summit is, however, often veiled by clouds, — partly accumulations of the mists borne up from the lowlands, but at times largely composed of the steam which is constantly pouring forth from the crater in vast volumes, and which seems to settle when the air is still and surcharged with moisture in layers forming a hood over the mountain-top (Fig. 2).

The day chosen for the ascent of the mountain was August 1. It proved to be in every way favorable, — a bright, cloudless summer day. I was accompanied by Mr. H. Satomi, an intelligent young Japanese residing in Oiwake, his birthplace, but during the winter months pursuing his studies in Tokyo. He is able to speak German fluently, and proved a valuable companion. Mr. Satomi brought with him two of his young friends. With Tora-san and two porters, we made a company of seven. The Sengen, or tutelary goddess of Asama, is, according to Mr. Satomi, regarded as the younger sister of the Sengen of Fuji-san. Asama is a sacred mountain, and we met a large party of pilgrims clothed in white, with bells tinkling at their girdles, returning from the mountain as we approached the cone. The path leading from Oiwake to the summit passes for a long distance over meadows rising gently toward the mountain. The soil is composed of gray doleritic ashes, which in spite of their harsh and seemingly sterile nature are covered with a most profuse growth of grasses and flowering plants. The liliaceous plants are especially conspicuous, and we passed through great beds of Funkia in full bloom, and collected specimens of no less than five species of Lilium, among them magnificent examples of Lilium auratum, the emperor in this regal family of flowers. Lying everywhere upon the surface of these flowery meadows, are stones varying in size from pieces two or three inches in diameter to huge blocks from ten to fifteen feet through, which have been hurled out of the crater. As the ascent grew steeper, we entered upon a belt of scattered and stunted pines, and after a sharp walk of about an hour and a quarter reached the edge of a shallow gorge, the sides of which support a tangled growth of flowering shrubs and vines. A quick descent over the gritty ash which composes the path brought us to the bottom at the foot of the cascade known as the "Bloody Fall." The waters of the stream, which make a leap of about eighteen feet over a wall of black volcanic breccia, are strongly charged with ferric oxide, which imparts to them an orange-red tint, and which is deposited in the form of a red crust over the bed of the stream and the rocks and fallen tree-trunks within reach of the spray of the cascade. Our little party was joined at this point by a farmer from a village in the south of Japan, who had in his possession two pieces of grayish sandstone in which some minute iron pyrites appeared. They had been given him by an aged relative, he told us; and he assured us that the shining particles were pure gold, and that he was on his way to Asama to pray to the Sengen, being confident that a revelation would be imparted to him of the location whence these precious fragments had been derived, and that in that case he was sure of his fortune. I told him that the crystals were not gold, and my companions good-naturedly chaffed him; but he shook his head, replaced the stones in their wrappings of soft paper, tucked them into his bosom, and went on with us cheerily.

The path crosses the stream just below the fall, and for a short distance follows its right bank along the edge of the gorge through which it flows, then turns off to the left. We passed close under the shadow of a high hill at the foot of which, by the edge of a little marshy meadow, is a spring of delightfully cool water. Crossing the meadow, we mounted by a steep ascent to the summit of a rounded ridge, along the top of which the path leads straight up to the cone. The ridge is flanked on the western side by the ravine at the foot of which is the little meadow of the spring; and on the eastern side by a deep, barren gorge, the walls of the opposite side of which are perpendicular cliffs of dolerite varying from 100 to 500 feet in height. It is evident that at some time the walls of the volcano have fallen in at this point. The area of subsidence extends about 1,200 feet in width from a little above the Bloody Fall to a point a little below the summit of the mountain. When this subsidence took place we have no means of historically ascertaining. That it was prior to the last great eruption in 1783, I think is evident from the manner in which the scoriæ thrown out at that time are deposited about the mountain. At the points where the walls of this depression are low, and where, as along the ridge upon the top of which the path from Oiwake leads, there are no perpendicular walls, the scoriæ which compose the covering of the cone are seen to form a stratum continuous with that which lies at the bed of the depression (Fig. 4), with no traces of disturbance at any point since the deposit was formed.

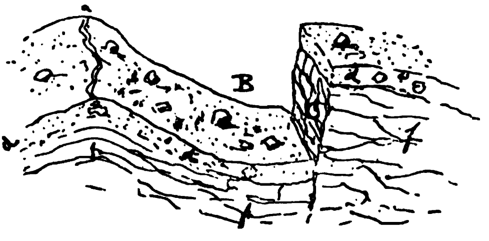


FIG. 4. IDEAL SECTION.

a a. Path leading along top of ridge to crater. B. Depression to right of the path of ascent. C. Cliffs on eastern side of depression. d, d, d. Scoriæ. f, f, f. Lava walls of the volcano.

The ravine upon the western side of the ridge up which the path leads, gradually disappears as we ascend, and at last with a few steps we leave behind us the zone of vegetable growth; the sole plant which dares to straggle upward into the barren mass of doleritic ash being a species of Polygonum, which also appears upon Fuji at an elevation of 11,000 feet. Though plant life ceases fully 1,000 feet from the summit of Asama-yama because of the sterile nature of the surface of the mountain, we were pleased to find even upon the summit within the outer crater wall, specimens of Colias Palaeno, an alpine butterfly, and of Papilio Machaon, var. Hippocrates, Feld.; the latter, no doubt, bewildered stragglers from the lower slopes borne up on the ascending currents of the air. The last part of the ascent after leaving the limits of vegetation is very trying. The path leads over the loose ashes of the cone, through which only here and there protrude the points of hidden dikes of lava. The surface of the cone for fully 1,600 feet of perpendicular ascent presents a slope of from 30° to 35°, and the greatest care had to be exercised to keep our party well together, lest the stones which were loosened by our footsteps as they bounded down the steep incline should do injury to those composing the rear of our little procession. Stones of the size of a man's head started from the edge of the outer crater, rolled and bounded down the mountain-side from the point where they were loosened, to the upper limit of vegetation, — a distance of fully 2,800 feet along the slope. The ashes of the cone are everywhere covered with the grooves and striæ made by fragments falling from the upper part of the mountain. We reached the edge of the outer crater at half-past twelve, having started from Oiwake about seven o'clock in the morning. The inner crater is not visible from Oiwake. The distance from the village to the crater is about nine miles, the vertical component of the walk being about 5,800 feet. The summit of Asama is 8,282 feet above the level of the sea.

Having found a shady spot at the side of a rock, we despatched our lunch, cooling the water we had brought in bottles by burying them in the snow which we found still unmelted on the northern side of the mass of lava which forms a remnant of the old outer wall of the crater, and is a conspicuous object upon the southeastern side of the cone as viewed from Oiwake. Inwardly comforted, we resumed the line of our march across the gentle slope which leads to the lip of the inner crater. About half-way between the outer crater and the summit of the inner cone is a low shrine cut out of a solid block of gray trachyte about six feet in cubical dimensions. The usual offerings of Shinto devotees — wisps of rice-straws and bits of white rags and paper — were found in the interior in abundance. Here our rustic friend with the iron pyrites prostrated himself in earnest supplication; but no heavenly voice rose above the roar of the crater, which had now become distinctly audible, like the sound of steam escaping from the safety-valves of a score of engines.

The view from the lip of the inner crater when we at last stood upon its southeastern edge and gazed into its apparently unfathomable depths, from which vast clouds of steam and sulphur smoke were issuing, accompanied by a roaring and hissing sound broken by occasional deeper detonations, was one which has indelibly fixed itself upon the memory. The spectacle is truly awe-inspiring.

The opening of the crater is a somewhat irregular oval, with its larger axis, roughly speaking, extending from east to west. It is situated upon the northern side of the old crater area (Fig. 5). This area is composed of volcanic sand and scoriæ of a grayish white color, with angular blocks of doleritic lava scattered about in profusion, except on the western side, where the surface is covered with columnar masses and ribs of lava of a deep red color shading into black. The red color is due, no doubt, to the weathering of the masses and the formation of iron-rust. The inner walls of the chimney are, generally speaking, perpendicular. Narrow benches or terraces, and a few broken slopes appear upon the southwestern side. The walls appear to be composed of bands of horizontally stratified rocks, prominent among which are thick veins of a lighter color, which are apparently masses of kaolin produced by the reaction of acids upon the felspathic lavas. This stratified formation is evidence of the fact that the cone has been built up by successive flows of lava and the deposition of layers of ashes upon the occasion of successive

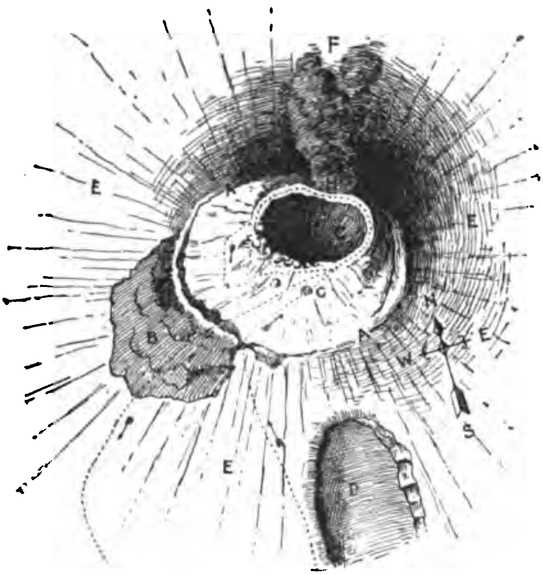


FIG. 5. CONE OF ASAMA-YAMA.

A A. Outer ring of crater, composed of ash. B. Protruding mass of lava. C. Present crater. D. Depression on side of volcano. E. Slopes covered with ashes. F Lava flow of 1783. G. Shrine. H. Point at which Plate VI. was sketched.

eruptions (Fig. 6). The lip of the crater on the southwestern and western side is higher than at any other portion, and is composed of red lava which presents a somewhat columnar form. The ring is lower on the northern side at the point at which the lava flow of 1783 took place. The rush of this terrible torrent of hot volcanic mud and melted stone wore the edge of the crater down fully 150 feet below the level of the other portions. The rounded outline of the lip at this point attests the action of this flow. A few hundred feet below this point the last portion of the lava which escaped at this time lies upon the ashes, with the edges of its broad masses curled up in cooling like slag upon the cinder-bank of a blast-furnace. From this point to the north for sixty-three kilometres or thirty-nine miles, the mass can be traced, its plications and wrinkles stretching across the deep valleys leading north into Kodzuke, and its surface at places a mass of blocks piled up in the wildest and most inextricable confusion. This eruption, of which an account drawn from native sources may be found in Milne's "Volcanoes of Japan" (pp. 92–107), was one of the most frightful physical occurrences which has taken place in the annals of the Japanese people. Scores of towns and villages were destroyed and hundreds of people slain, and the country converted into a desert for miles around the mountain. The ashes fell to the depth of an inch in Tokyo, and about the mountain itself they were deposited to a depth of from one to four feet over an area twenty miles square. "Rocks from forty to eighty feet in some of their

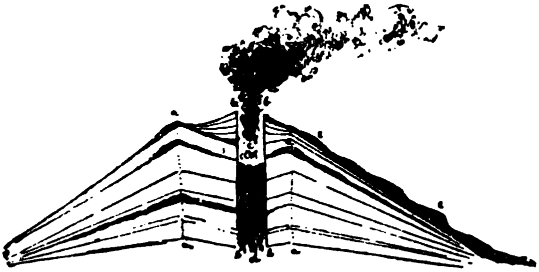


FIG. 6. IDEAL SECTION OF CONE OF ASAMA-YAMA.
a a. Outer ring of crater. b b. Ring of present crater. c. Chimney. d. Sources of steam. e e. Lava flow of 1783.

dimensions were hurled through the air in all directions. One stone is said to have measured 264 by 120 feet. It fell in a river, and looked like an island."[1] The noise of the eruption and the tremor of the earth accompanying it were perceptible as far away as Omi and Ise in southern Japan, — or from 190 to 200 miles away, as the crow flies.

The depression in the northern lip of the crater seemed to afford a favorable point for attempting a sketch of the crater (Plate VII.). This completed, I determined to ascertain roughly its circumference by pacing about it, keeping as near the edge as the nature of the ground would allow. At places even on the very lip of the crater there are fissures through which hot steam and the fumes of sulphur issue; and especially about the western margin is the ground treacherous, being full of steaming and smoking rents. The air was quite still when I commenced the task, and the vast column of steam mingled with pungent and suffocating fumes of sulphur was steadily soaring upward to an unknown height. Starting from the point where we had first struck the edge of the crater, I passed around to the north and entered the labyrinth of red blocks of lava on the western side. From rents among them steam was issuing with a loud noise. The Japanese with me called to me to return, and the two porters were especially urgent in seeking by word and gesture to prevent me from seeking to go around by this way. I presently realized that they were right. A wind from the east had sprung up; and the great column of smoke and steam, instead of rising as it had been doing, began to trail its dense columns over the spot where I was. The vapors are composed of hot steam mingled with the fumes of burning sulphur and hydrochloric acid. The tears started to my eyes, the lining of my nose and throat felt as if on fire, a sharp pain pierced the lungs. I realized that not a moment was to be lost. Groping my way half blinded out from among the rocks, I started to run down the slope away from the cloud. A rent lined with little sulphur jets and of unknown depth arrested my footsteps. I ran downward along its course until I found a place where I could leap over it, and then turning southward

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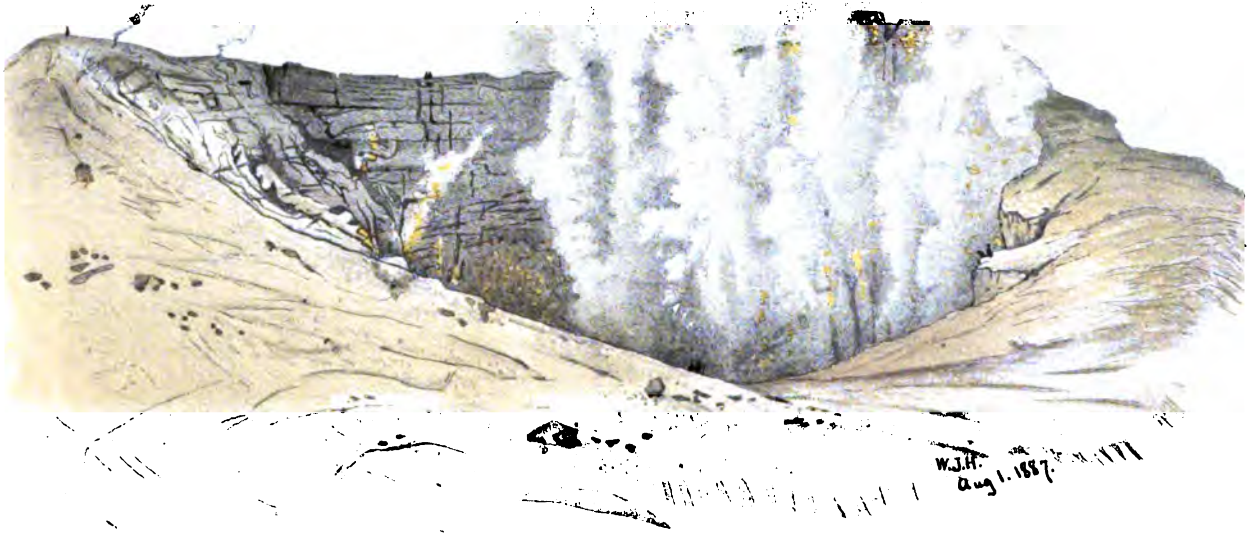
[1] Milne, Nature, Dec. 16, 1886, p. 153.


W.J.H.
aug 1. 1887.

INNER CRATER OF ASAMA-YAMA

held on my way until I felt and saw that I was safe. Relating my experience some weeks afterward to a learned friend who is familiar with the place, he said: "I am simply astonished at your temerity in going into that place. I have been three times upon the mountain, and would never have ventured where you did, as the smoke always seems to hang about that spot." It is needless to say that in this operation my attempt to pace about the ring of the crater was sadly interrupted. However, I determined, if possible, not to be defeated utterly. From my point of starting to the point where I had been compelled to turn back by the cloud of smoke, I had counted 1,070 paces. Returning again to the edge of the crater upon the southern side and east of the smoke which was now under the influence of a high wind being driven away to the west, I paced off 490 paces to the point of starting. This left me, roughly, about one fifth of the circumference unaccounted for. Adding the fourth of 1,560, or 390, paces to those which I had succeeded in walking at a distance from five to twenty feet of the brink, I ascertained a total of 1,950 paces. Reckoning an average stride at two and one half feet, we have given a circumference of 4,875 feet. The diameter according to this result, were the opening circular, would be 1,233 feet, or 411 yards. This estimate is, however, too high, owing to the fact that it is impossible when pursuing this method of measurement to keep upon the brink of the crater, and owing to the roughness of the ground, to take even strides. Throwing off sixty feet, or twenty yards, from the result above given, we have an approximated diameter for the mouth of the crater of 1,173 feet, or 391 yards. Col. H. S. Palmer, R. E., by walking around a semi-circumference of the crater, estimated the diameter at 370 yards.[1] Various estimates of the dimensions of the crater have been given at different times. One writer alleges the diameter to be 200 yards (or 600 feet); V. Drasche estimates it at 1,000 metres (3,280 feet); the older Japanese authorities say the circuit of the crater is one and a half ri, or three and three quarters miles, which would give us a diameter of about one and a quarter miles.

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[1] Nature, Dec. 16, 1886, p. 152.

This latter estimate is a gross exaggeration, as has been pointed out by several writers, while the first mentioned of 600 feet is manifestly too small. I venture the assertion that the estimate of Colonel Palmer and my own will be ascertained, when exact measurements come to be made, to be more nearly true. The approximate diameter is from 1,100 to 1,250 feet.

The question of the depth of the crater has attracted much attention. By going out upon one of the rocks which rise upon the edge of the crater a little west of the northernmost point of its circumference, it was possible now and then to catch a glimpse of the bottom when the wind, bowling down over the eastern lip of the crater, lifted up and scooped out the masses of steam and smoke. At such moments I saw that the floor was apparently flat, and composed of white sand with blocks and bowlders scattered over the surface. At the easternmost point there seemed to be a deep black cavern or recess out of which steam was issuing in great volume. From points in the floor jets of steam and yellowish sulphur smoke were being emitted; and it was noticeable that the escape of the steam and smoke was not regular, but somewhat intermittent. The gases seemed to be thrown off in puffs. All along the side smoke and steam issue from rents and crevices, and some of the puffs of yellowish brown smoke had a downward direction; and I noticed that when this occurred, in one or two instances small fragments of stone from the crater walls seemed to be broken off and roll into the chasm. These fragments I judged from their color were composed of incrustations of sulphur upon the walls, which are no doubt constantly forming and as constantly falling. The walls do not converge rapidly toward the bottom, and there is a floor of considerable extent shelving downward from the northwestern to the southeastern side of the crater. An attempt to sound the crater by a method as ingeniously simple as it promises to prove satisfactory was made on Oct. 2, 1886, by Messrs. Milne, Glover, Stevens, and Dun, of Tokyo, to the latter of whom is entirely due the credit of the general arrangements of the measuring operations. A full account of the experiment is found in "Nature," vol. xxxv. No. 7, p. 152.

The result was the conclusion that the greatest depth is about 750 feet, though, owing to various difficulties which were encountered, this result is only roughly approximate.

Standing upon the rock of which I have spoken, it occurred to me to attempt to ascertain the angle made with the perpendicular, by sighting from the edge of the rock to the opposite side of the crater floor. I used for this purpose a common protractor, affixing it to the bamboo handle of my insect-net, set perpendicularly in the ground and sighting along a lead-pencil held at the notch (Fig. 7). Of course with such a rough apparatus only a very rough approximation to the angle could be ascertained, but it may be regarded as being about 45°. Now suppose that the estimate of Colonel Palmer, which gives the crater a diameter of 1,110 feet, be correct, we can easily ascertain that the opposite wall, provided it descended with absolute perpendicularity, would be 1,110 feet high (Fig. 8). But the walls, in spite of their apparently perpendicular character, in most parts undoubtedly converge considerably. It is safe to say that they form with the perpendicular an angle of not less than 12°. This being the case, the eye perceives the bottom of the opposite wall of the crater at a point which must be fully 150 if not more feet above the level at which the eye would strike the bottom of the opposite wall, if this were absolutely perpendicular. Deducting this from 1,110 feet, we have a depth of 960 feet to the floor of the crater. Of course all the measurements employed in this calculation are only rough approximations, and the result is only removed a few steps in value above a guess; but it is

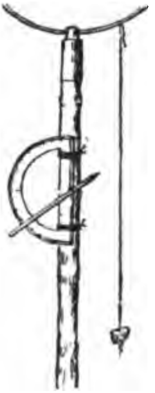


Fig. 7.

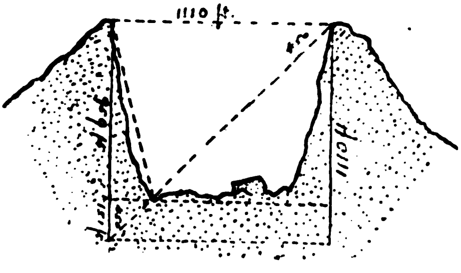


Fig. 8. Diagram illustrating Method of estimating Depth of Crater.

evident to my mind that we must throw aside as valueless the conjectures, some of which have been published, assigning to the crater a depth of several thousands of feet. The extreme depth, measuring from the highest part of the crater walls to the lowest point of the floor, will not prove, when final and exact measurements are made, to exceed 1,200 feet, and will probably fall short of this by several hundred feet. Nevertheless the crater is undoubtedly one of the deepest known upon the surface of the globe. Had I, before setting out for Oiwake, realized how wide the divergence of opinion as to the dimensions of the crater has been, I should have provided myself with the necessary instruments to ascertain with some degree of mathematical certainty what the circumference, the diameter, and the depth actually are. These problems are such as can be solved with absolute certainty by means of trigonometrical measurements.

The return from the mountain-top was made in far less time than the ascent, with no misadventure save the loss, on the part of our rustic seeker after revelations, of his broad coolie hat, which was whisked away by the wind and carried over the cone, necessitating a chase of a good quarter of a mile before it was recovered.

III. NASU-TAKE.

Having rejoined Professor Todd and party at Shirakawa upon the 8th of August, my attention was attracted upon that and the following days to the features of the range of mountains lying about twenty-five miles to the west of Shirakawa; conspicuous among them a peak which was plainly an active volcano, throwing forth considerable volumes of steam. This phenomenon had already arrested the attention of our astronomer, and awakened a measure of solicitude in his mind, inasmuch as this steaming peak was situated at a point upon the horizon almost directly below the spot which the sun would apparently occupy in the heavens upon the approaching 19th of August, at the time of total eclipse. During the early part of the stay of the expedition at Shirakawa, the volcanic character of this peak had not been suspected, as the whole range was generally veiled more or less with horizontal bars of cloud and mist; but the permanence of the cloud-veil on bright days when elsewhere there was not a cloudlet to obscure the blue sky, and an inspection with the lens of a four-inch telescope revealing the existence of a crater, had led to the conclusion that this mountain was one of the great fraternity of "fire-peaks" with which Japan is so thickly covered. As the result of diligent inquiry among the people employed about the castle, I ascertained that the name of the peak is Nasu-take; that it had erupted in the year 1880 and had been active ever since, and that it would be a rather tedious undertaking to reach its summit. I also ascertained from Professor Nakagawa that very little is really known about the mountain by the Japanese themselves, as it lies out of the line of travel, in a wild and sparsely populated corner of the great central ridge which parts the waters of the eastern coast from those of the western.

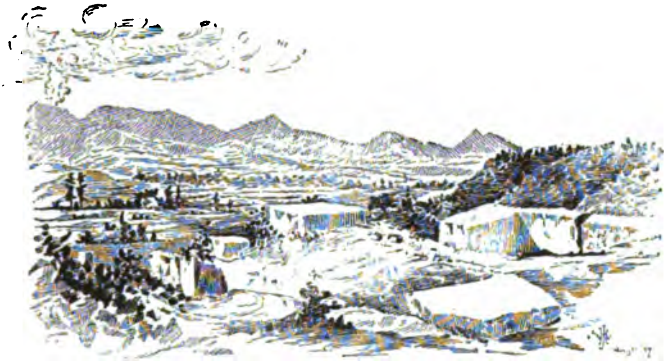


Fig. 9. Range of Kodzuke Mountains as seen from Shirakawa.

The peaks are, in order from the left, known as Nasu-take, Bishamon-take, Asashi-take, Kashi-san, and Futamata-san.

Here, then, were all the elements which serve to give zest to a mountain-climb, and accordingly I resolved to examine Nasu-take deliberately and carefully.

I left Shirakawa on the morning of Friday, the 12th of August, taking with me Tora-san and six jinrickisha-coolies, two for each of the vehicles which we used. We followed the Oshiu-kaido as far as Ojima, a little hamlet which we reached at noon and where we lunched. The Oshiu-kaido, after leaving Shirakawa, traverses a series of broad meadows and low moorlands, which rise in terraces, and are covered with deposits of gravel. These level expanses are capable of being utilized for purposes of agriculture, but are for the most part lying waste, and were a sea of wild-flowers at the time of our visit. Leaving the main highway at Ojima, we struck across the country to the west by a foot-path over which the coolies for the greater distance carried their jinrickishas. The path leads through grassy levels covered with a scattered park-like growth of oaks and chestnuts, with here and there a group of cryptomerias and pines. Along the water-courses there are luxuriant growths of tall bamboos, and thickets of magnolia trees. The path conducted us past several rude hamlets, surrounded by rice-fields and patches of taro, enclosed by hedges of Philadelphus coronarius, L. On a rising knoll we found a field of potatoes and maize enclosed by an old-fashioned Virginia worm-fence, the only one I have ever seen in the Orient. The spot had a western, new-world appearance, not lessened by the absence at that particular point of all trees characteristically Japanese, the only growth being oaks. As we came nearer to the mountain, the forests grew denser, and the air became laden with a mild odor of rotten eggs, which we presently ascertained was due to the fact that a swiftly flowing brook which we crossed was strongly impregnated with sulphur. Its waters are quite tepid. The path was now over masses of the dark gritty ash peculiar to volcanic districts. After a sharp climb by a winding but smooth road which we struck and which we ascertained leads to Kuroiso, we came to the village of Yumoto, situated on a bench of the hills, on the western side of a deep gorge in which a couple of establishments for the reduction of sulphur are located. There is but one street, through the middle of which extends a row of five bath-houses fed by the hot sulphur water from the springs. These bath-houses consist of roofs covering tanks of wood about three and a half feet deep, and twelve to fifteen feet square. The hot water, which enters them at a temperature of about 150° Fahr., is lowered to about 125° by the introduction of cold water through bamboo pipes. At the time we entered the village, we found almost the entire population, male and female, engaged in disporting themselves in the steaming tanks. There are three hotels in the place. We sought out and found accommodations in the largest and best of these, known as the Momatsuya. The elevation of Yumoto above sea-level is about 2,500 feet. There are no mosquitoes there, but fleas abound.

The next morning, taking with us two guides, we started for the summit of the volcano. The path leads by a steep ascent along the western side of the gorge on the edge of which the town is situated, and enters a grove of magnificent oaks, in the midst of which, surrounded by a luxuriant undergrowth of Andromeda, we found a Shinto temple and a shrine dedicated to Hachiman. The stone torii before the temple are fine specimens of this peculiar structure. On the grassy hill-slope above the temple we found large numbers of horses and colts browsing. The chief occupations of the people of the neighborhood are stock-raising, charcoal-burning, and the mining and refining of sulphur.

The cone of the volcano with a white column of steam rising above it became visible, as we emerged from the wooded hill-side and surmounted the rounded grassy top of the eminence formed by a jutting spur of the central peak. Great blocks of augite andesite, some of them twenty feet long and fifteen feet wide and high, were scattered about on the hill-side, showing what titanic forces have exerted themselves in the mountain above us. Passing across a long reach of grassy land, we came to a second rounded boss upon the side of the mountain built by a flow of lava which has become red with iron-rust in the process of weathering, and supports a dense mass of tangled shrubbery, low trees, and bamboo grass, which in places has been deadened by fire. The thickets here were full of the Unguisu, or Japanese nightingale (Cettia cantans), a sweet songster, whose notes are a medley of those of the nightingale of Europe and the yellow-breasted chat (Icteria virens, L.) of the eastern United States.

Struggling on through the tangle over the exceedingly rough path where at places we were compelled to crawl and drag ourselves up over the rough masses of lava, we came to a great cliff of volcanic breccia, from the edge of which a small streamlet of water trickled and was caught in a pail kindly placed there by some thoughtful pilgrim. We drained it dry, and blessed the man who had invented buckets. Another stretch through masses of bamboo grass which were replaced at last by ericaceous plants and the dwarf trailing mountain-pine, which never grows higher than three feet, brought us at last to the foot of the naked cone of ashes and broken fragments of andesite. For about 700 feet we made our way up the cone, and at last found ourselves at the southern edge of the crater, at an elevation of about 6,300 feet above the level of the sea. We had occupied five and a half hours in the ascent from Yumoto, of which time about two hours had been consumed in sketching and collecting specimens of natural history.

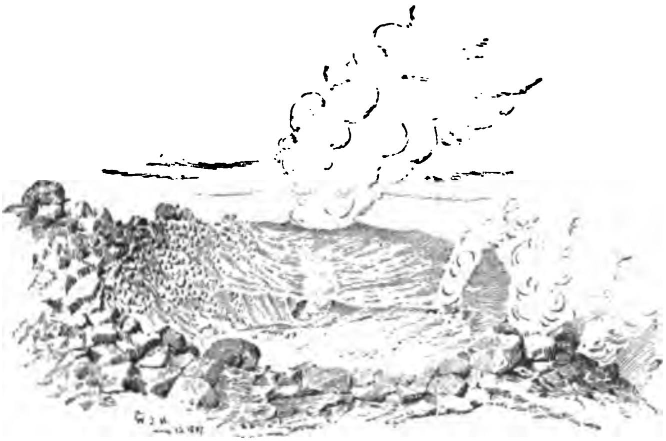


FIG. 10. CRATER OF NASU-TAKE, FROM THE SOUTHEASTERN EDGE.

The cone of Nasu-take is composed of masses of augite andesite piled up in confusion, and forming on the southern and western side of the summit the well defined ring of a crater. On the eastern and northern side of the summit the rocky ring is absent, or exists at a lower level overlaid by a thick deposit of volcanic mud and scoria. The circumference of the crater is roughly about half a mile. The top of the mountain has been evidently cracked by the eruption which occurred in 1880 in a line running with an irregular course from east to northwest. The rent, which apparently extends on the eastern side of the cone to a depth of about 200 feet, is discovered on the northwestern side at a depth of fully 600 feet below the summit. The crevice has been partially filled up by ashes and mud; but a number of rents through which hot steam and sulphur smoke are escaping in great volumes are still found. The smallest of these are upon the eastern extremity of the crater. The steam here is characterized by the familiar smell of laundry steam, and awakened thoughts of "washing-day," of soap-suds and red-armed washerwomen. The vents are at a depth of five or six feet below the surrounding surface. The steam issues from cracks and openings among the stones which are piled up loosely at the bottom and covered with a deposit of beautiful crystals of sulphur. Near the centre of the crater area is situated what was undoubtedly a short time ago one of the largest of these openings, from which now very little steam escapes. The opening has been closed apparently by the washing into it of volcanic sand and mud, and there is evidence that at the time of a heavy rain a shallow puddle about fifty feet in diameter is formed at this, the lowest point of its area.

At the northernmost point of the cone a vast volume of steam and biting sulphur fumes pours perpendicularly into the air. An inspection of the cone at this point shows that the mountain has been deeply rent on this side, and that vast masses of volcanic mud and broken fragments of rock have been recently ejected. The ejectamenta form terraces and spurs upon the mountain-side, covering a wide area upon the northwestern slope, and partially filling up the deep valley which lies between Nasu-take and the adjoining peak known as Bishamon-take. By descending the cone on the northern side for about 300 feet, and then passing around westwardly to the edge of the great rent, we were able to inspect it thoroughly. It forms at its upper part a chasm about thirty feet deep and about fifty feet wide, lined at every point by deposits of sulphur at places burning with a blue flame. Through innumerable openings among the rocks hot steam rushes forth with great violence and a loud roaring noise. Occasionally deep reports, perhaps caused by the bursting of rocks within the rent, are heard. The rent, as we descend along its eastern edge, is gradually closed over by a mass of felspathic debris and kaolin filled with crude sulphur in the form of crystals. The covering which here bridges over the rent is soon seen to be a portion of the walls of a small lateral crater lying at the lowest extremity of the great crack in the mountain. (See Plate VIII.)

From this crater immense volumes of steam are escaping. By tossing stones into the opening, which has a diameter at the lip of about ninety feet, we ascertained its depth to be approximately 250 feet. The clouds of steam were here adorned by a livid rainbow, the emblem of hope set over what seemed to be the portals of hell.

One of the most remarkable features of this locality is that which attracts the attention of the observer when seated on the northern lip of the crater of Nasu-san and looking over to Bishamon-take. This mountain has evidently been cleft and split in several places, and a great piece of the southwestern side of the mountain has slipped away and sunk into the earth. This event must have occurred during the eruption of 1880, for the trees upon the part that has fallen away have evidently been killed so recently that they have not had time to decay, and there has been no time for new growths to lay hold of the bare surfaces exposed at the time of the rupture. The situation suggests very strongly the idea that the centre of weakness in the earth's crust was below Bishamon, and that the semi-fluid contents of the cavity under this mountain having been ejected through the vents of

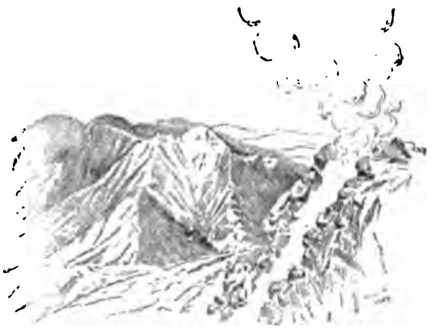
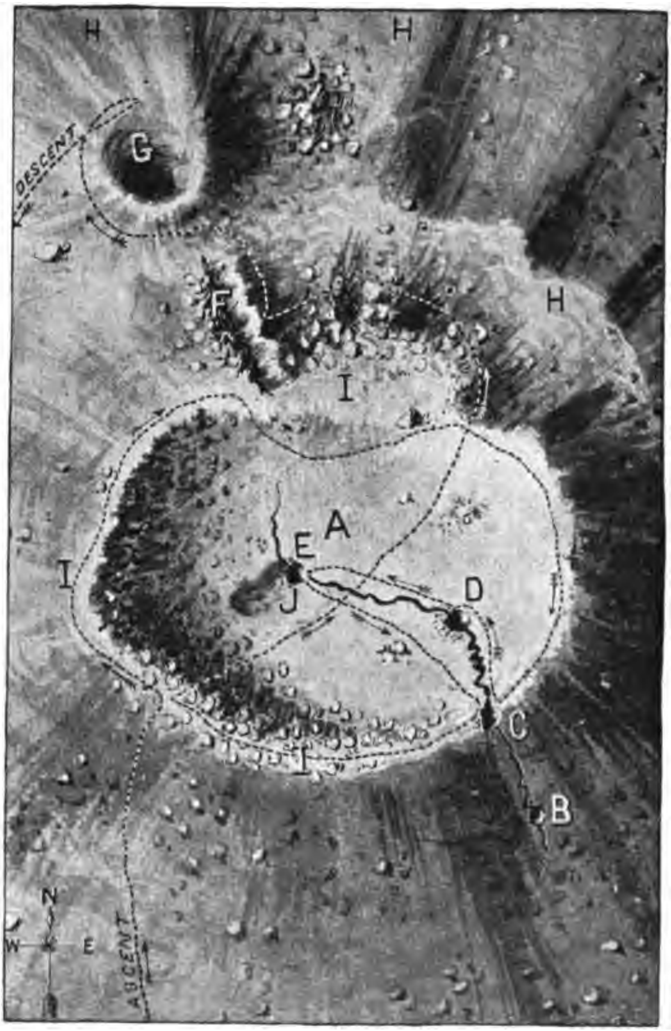


FIG. 11. CLOUD OF STEAM POURING UP THE RENT ON THE SIDE OF NASU-TAKE.

Bishamon-take, on the opposite side of the valley, a part of its summit split off and half buried in the earth.



PLAN OF CONE OF NASU-TAKE.

A, Crater. B, C, D, E, Fumaroles situated on line of crack crossing the crater. F, Deep rent, emitting steam and sulphur smoke. G, Lateral crater. H, H, H, Terraces of mud and scoria. I, I, I, Stony walls of crater. J, Depression of crater floor in which water collects.

the adjoining peak Nasu, the western half of Bishamon caved and fell into the hole then created (Fig. 11).

Leaving the lateral crater, we made our way around the cone to the southern side, where we had first struck it, and descended as we had come, arriving at Yumoto just as it became dark, in time to escape a thunder-shower which raged all night long among the mountains. The next day being the Sabbath, was spent in quietly resting; and upon the Monday following we returned to Shirakawa, arriving late in the afternoon in the midst of a drenching rain, which we might have escaped had we not been so busily engaged during a part of the forenoon in collecting specimens of the magnificent afterwing moths, Catocala nivea and C. volcanica, which we found abounding upon the trunks of the cryptomeria trees on the higher parts of the mountain below Yumoto.

EXPLANATION OF PLATES.

PLATE VI. View of Nantai-san from the side of Lake Chiu-sen-ji, opposite the village of Chiu-sen-ji.

PLATE VII. Sketch of the inner crater of Asama-yama from the point where the lava flow of 1783 occurred. The rock upon the right of the sketch is the point from which the bottom of the crater was seen by Professor Milne and myself.

PLATE VIII. Relief map of crater of Nasu-take, sketched from drawings taken on the spot.

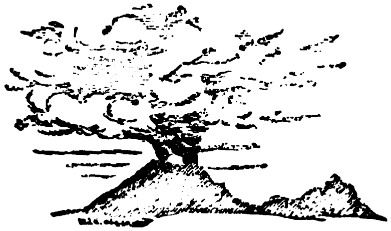


FIG. 12. ASAMA-YAMA, AS SEEN FROM SHIRAKAWA, AUG. 20, 1887, AT 9 A. M. (the day after the eclipse).

The Great Smoky Mountains and Thunderhead Peak.

By Frank O. Carpenter.

Read November 11, 1889.

A massive chain of lofty mountains, two hundred miles long, forms the western boundary of the State of North Carolina. Known generically as the Smoky Mountains, it is nevertheless divided by deep river-gorges into five sections, each of which has its separate name. The most northerly of these is called the Stone Mountains; then follow the Iron, Bald, Great Smoky, and Unaka Ranges, of which the Great Smoky Mountains form the culmination. From the picturesque gap through which flows the French Broad River on the north to the narrow gorge where the Little Tennessee pours the waters of five counties through a gateway only eighty-five feet wide, the mighty wall extends for a distance of sixty-five miles, unbroken except in one place by the valley of the Big Pigeon. Nineteen peaks over 6,000 feet, including (the highest) Clingman's Dome, 6,660 feet, Mt. Guyot, 6,636 feet, and fourteen more over 5,600 feet in altitude, connected by massive ridges and interspersed with peaks only a little lower than those mentioned, make a remarkable group of mountains.

A comparison may assist those familiar with the Presidential Range in the White Mountains. Imagine a range of mountains extending from Gorham to Plymouth containing a dozen peaks higher by several hundred feet than Mt. Washington, and twenty others as high as Mt. Adams, with many lesser spurs and ridges as high as Mt. Lafayette. This gives a fair idea of the Great Smoky Range.

In a few places, far apart, the old Indian trails have been made passable for wagons; but these roads cross the range through gaps at high elevations, never less than 5,000 feet, by long and difficult routes. Winding roads also follow the rivers through the deep narrow gaps, sometimes hardly wide enough for a road to find place between the mountain and river. Save for these slender bonds of communication, the people of North Carolina and Tennessee are separated by many leagues of unbroken forest and rugged mountain ridge.

The mountains are entirely wooded, except on a few summits, called "balds," where the treeless tracts are covered with luxuriant grass and patches of bushes breast-high.

Toward the southern end of the range stands a peak, the last of special prominence, known as "Thunderhead." Stern and impressive, it lifts its giant head. Around it continually hover the great clouds, while the lightning flashes from it, and the thunder rolls and echoes about it as though it were the judgment-seat of mighty Jove himself.

During the past summer it was the good fortune of the writer to climb Thunderhead and to traverse a part of the range; and he submits to the Club the following account of his trip as germane to his duties as Councillor of Exploration.

Maryville, the county-seat of Blount County, Tennessee, is the most convenient starting-place for one who wishes to visit the most picturesque summits of the Great Smoky Range. Charleston is the nearest point on the Carolina side, but it requires an extra day's journey, at greater expense, to reach that place. Maryville is sixteen miles south of Knoxville, and is the present terminus of the Knoxville and Charleston Railroad. At Knoxville connections can be made with railroads running north, south, and west.

Maryville is a prosperous country town, of about 1,200 inhabitants. It has several churches, a court-house, two small colleges, and perhaps twenty stores, at which can be procured supplies needed for a camping-trip. These supplies must be carried, for the people in the mountain district can only furnish corn meal and bacon. Several flour and saw mills do a good business; but somewhat of the old-time sleepiness still prevails, and the town is quiet as on a holiday. One characteristic sight is novel to a Northern eye. Scores of thin, fierce-looking, but mild-mannered hogs, of all sizes, run freely about the streets, sleep peacefully on the sidewalks or in the gutters, or move slowly with reproachful grunt out of the way of the passer. Pleasant views are obtained from several knolls near the centre of the town, from one of which the "Smokies" may be seen thirty miles distant beyond the high foot-hills of the Chilhowee Range. Maryville is a favorite stopping-place of Miss Murfree ("Charles Egbert Craddock"), and several of her stories have been written there, — "In the Clouds," "Thunderhead," etc. Mr. James Wilson, Surveyor, has an intimate acquaintance with the mountain region, and is most cordial and kindly to the visitor seeking information. One old building, a hotel, once a famous resort, is very picturesque. It was built with wide double verandas, in the Southern style. Large pillars, three feet in diameter, made of laths covered with plaster, rise to the roof. The passing years have dealt hardly with the old hostelry. The great columns have lost their plaster here and there, the stucco walls are broken, while a wagon and blacksmith shop occupy the ground-floor, and send their echoes through the rooms once thronged with beautiful women and brave men. But as if mindful of its former glories, the old building holds itself erect and stately, like an old planter ruined by the war, still dignified and courtly in his threadbare clothes.

We reached Maryville Wednesday evening, July 24, 1889, and stopped at the Jackson House (rates, $2.00 per day), a fairly comfortable hotel on the main street next to the old hotel just mentioned.

Thursday was rainy, and we made a few purchases and waited for the last letters before setting out for the woods. Friday was threatening, but we decided to start for a point at the base of the range where we could begin our ascent as soon as the weather should be favorable. At ten A. M. we were off, in a two-seated carryall, our destination being "Jake Freshour's" in Tuckaleeche Cove, twenty-five miles distant, where we expected to pass the night and get a guide, A "cove" is a valley that lies between two mountain ridges, generally ending in a point like a cove on the sea-shore.

The road from Maryville is generally good, but the heavy rains of a month had made many washouts, and frequently the road made a sharp curve towards the high bank around some pools of red mud whose depth and tenacity no one seemed willing to test. The scenery along the way for the first five miles was pleasant, and on a bright day would be delightful. The red earth makes the abundant foliage seem brighter, and the changing views of hill and dale are attractive. Tall cornfields waved their plumes and rustled a greeting to us. Once the plump ears tempted us, and we picked a number, and ate them raw as we rode along. The kernels were just "in the milk," and were juicy and sweet as stolen fruit should be.

A short distance farther on, we reached Little River, which we followed the rest of our way, crossing it by fording several times. As we advanced, the scenery began to lose its New England appearance. Log-houses appeared, with a broad chimney at the end made of sticks and mud, the roof projecting in front to form a veranda roof. Sometimes we saw fastened to the shore a "dugout" so long that it seemed as if it could reach the opposite bank if swung across the current. Several times the road crossed the stream by a ford so deep that the water came into the carryall as we jolted over the stony bottom.

About ten miles from Maryville we entered Chilhowee Gap. The Little River, which rises in the Smokies, has cut a passage for itself directly through the Chilhowee Range to a depth of a thousand feet below the summit. The scenery through the gap is of wonderful beauty, and the ride surpasses any the writer has enjoyed in New England. The road wound about the spurs on a narrow terrace high above the stream, while through the trees we caught many a glimpse of steep wooded slopes rising abruptly from the roaring stream, sometimes several hundred feet below us. It being daytime, we caught no sight of the "Harnt that walks Chilhowee."

Beyond the gap, the road passed through several secluded valleys shut in on all sides by high ridges, and at last we came to Tuckaleeche Cove. For several miles the river runs quietly along, a fertile intervale on one side, and on the other a rocky bluff in which are numerous caves which we were tempted to stop and explore. Some of them were used in war-times for hiding-places by the loyal Union farmers during rebel raids. We saluted one old man with a "Howdy" as we passed. Our driver told us it was Sam Walker, an old moonshiner whose daring defiance of the law had gained for him the title of "King of the Mountains." We passed the "Tuckaleech" settlement, consisting of a small store, a church, and two or three houses a half mile apart, and reached Freshour's at four o'clock in the afternoon. Mr. Freshour is a well-to-do farmer, and very kindly; but owing to the illness of his wife, he could not keep us over night, and we decided to push on to the house of Bill Walker, the best guide in the section. After a hastily prepared supper of fried chicken, warm biscuit, and honey, we hurried on, following the directions of Mr. Freshour, who escorted us a short distance. We crossed Little River on the edge of an old mill-dam, and pushed on as fast as possible up stream. But the twilight was short, and soon it became evident that the narrow, indistinct path could not be followed in the dark. We found shelter for the night at the house of Mr. Myers beside the river, and wearied by the long, hard ride of the day, slept soundly in Myers's best bed, lulled to sleep by the murmur of the water, and the cry of a locust who had outlived all his fellows.

In the morning we paid the modest sum of twenty-five cents apiece for lodging and breakfast, and went on our way. Again we crossed the stream on a log-bridge and came to another cabin where a tall man was leaning idly against the door. "Howdy?" was his salute, to which we responded, "Howdy?" "What might your name be, stranger?" he asked. Repressing a desire to tell him it might be Smith but was n't, we told him and asked his. "Myers," was the answer. We talked a moment, and went on. A quarter of a mile beyond, an old lady came from her cabin to see us. She was a Myers. A mile beyond, another Myers gave us a drink; and his brother was just beyond; while the barefooted woman who cooked for Walker, and Walker's son-in-law were named Myers.

The path to Walker's is only a mountain trail, zigzagging from side to side of the stream, and sometimes requiring careful attention to tell where it crosses on some fallen tree-trunk and threads its way among the thickets. There for the first time we saw the tangle of rhododendron which is called "laurel," and forms a dense thicket along all the mountain streams.

We reached Walker's at eleven o'clock, — a rude log-cabin at the highest point of the cove, situated on a high bank above the reach of floods. It is surrounded by a tiny farm of a few acres, with the forest within two hundred feet of the house. We found the guide at home. "Bill Walker," "Black Bill," and "Smoky Mountain Bill" are the names by which he is usually known. He wears a large, bushy black beard, which gives him at first a rather fierce appearance; but he has a very large, warm, faithful heart. We stated our wish to engage him as guide for our trip. After some discussion and hesitation on account of some farm-work that was urgent, he consented to go. The afternoon was spent in preparations and in listening to stories of the mountains, among which it was interesting to find several showing a firm belief in the power of some persons to take on the form of animals for the purpose of injuring others, exactly like the European belief in werewolves. At nightfall we ate our supper of bacon, corn-pone, and honey, and after watching the stars through the wide cracks in the roof, we fell asleep.

The next morning the party started at eight o'clock for the summit of Thunderhead. It is not in sight from Walker's cabin, being eight miles distant behind the high, nameless foothills. Walker led; the writer came second, F—— third, and a young man named Stinnett brought up the rear. We crossed the Little River, then traversed a steep, sloping field, and entered the woods. Two steep ridges were crossed before we reached the main slope of the "Smoky Mount'in." Many years ago a road was surveyed and partly graded towards the top of Thunderhead, but it was given up. The storms have done their best to efface it; but there still remains a terrace, making a fairly easy path for several miles. We came upon this about half-way up, and followed it as far as it went.

The day was very hot. The sun seemed to exult in his release from his cloud prison, and shot at us his fierce rays, which the cucumber-trees with their broad umbrellas of leaves tried in vain to ward off. Water was scarce; only twice in the eight miles did we find any. The Tennessee side of the Smokies, though entirely covered with forests, is rather barren and rocky, as compared with the Carolina side, which abounds in streams flowing beneath a luxuriant forest growth.

At the second spring we stopped for lunch. A fire was started, and the pone put to bake on a wide chip. Pone is the common food of the mountaineers. Corn meal is stirred up with water and a little salt, and the solid mass is put to bake, or rather to dry, on a board by the fire. When done, it is the most solid food imaginable. Sometimes, to make it more palatable and digestible (?), it is baked in the fat left after the bacon is fried. Sad experience teaches the necessity of becoming "acclimated" to this food before starting on a mountain trip in the south.

After lunch we climbed on, soon reaching the crest of the ridge, which we followed. Occasionally a welcome breeze fanned our faces; and beyond a great ravine, rose the dark summit of Thunderhead. We reached the end of the road, and then followed a stony trail through the rhododendron bushes, which rose far above our heads. A few late clusters of blossoms remained, some of which we gathered and carried for a while. Steadily, but rather slowly, we climbed up, for the air in the narrow path under the tangled laurel was very hot and enervating. About three o'clock we came to the open pasture on the top of the ridge, and with delight threw ourselves down to rest, 5,000 feet above the sea. Hundreds of cattle, horses, sheep, and hogs roam at will during the summer over the ridges, which afford the finest grass for grazing, and grow fat without further care or attention than the occasional visits of the herdsman to "salt" them. Those on the summit came charging down upon us, led by curiosity and desire for salt, but soon returned to their grazing. The ridge where we were was shaped like an enormous saddle, and the light fresh green of the grass like a saddle-cloth extending a hundred rods down to the dark green forests increased the resemblance.

The view was inspiring. Though clouds still veiled many of the farther peaks, yet the ridges and peaks rose across great ravines in an endless array as far as the eye could follow. Infinite were the gradations of color, — from the black summits where it still rained, through violet, purple, and gray, mingling and blending with the harmonious browns and greens of the foliage, under the touch of the Master Artist. Towards the west the sunshine wrapped the mountains in mantles of golden mist set with turquoise and opal and pearl.

At last we reluctantly took up our packs, for our camping-place was several miles distant, and followed a herder's path along the ridge. One lonely little cabin stood a few rods down the slope, used by the herdsmen in charge of the cattle on the range. The herder came to the door, and shouted a few indistinguishable words. We shouted and waved our hands in answer, and hurried on. Twenty minutes' walk brought us to a rock on the highest summit of Thunderhead, 5,520 feet high, where we stopped a few minutes to rest, and watch the great ridges as they grew dark, while the deep shadows climbed out of the ravines.

The view from the summit is a very far-reaching and impressive one. In every direction great ridges with noble peaks rise successively till the eye wearies from trying to follow them in their varied changes. To the south the Warrior Bald of the Nantchalch Range rises behind the intervening foot-hills. Northward stretches the main line of the Smokies, with its scores of lofty peaks. Clingman's Dome is in the near foreground, ten miles away. Toward the east the dark-green summits of the Balsam Range shut off the view beyond several great ravines and valleys. West over the summits of the Chilhowee Range lying close at hand the Cumberland Mountains of Tennessee crowd the horizon line, and blend with the blue and the clouds. Picturesque rocky summits like those of New England are missing from the view; but the strong, rugged ridges, deep ravines, and majestic peaks, all covered with a mantle of green and brown in infinite gradations of light and shade, make a view the beauty and grandeur of which will long be remembered.

As we left the peak, the almost omnipresent thunder growled in menace. A mile north of the peak we came upon a brook nearly on the summit of the ridge where we planned to camp.

Soon we had a fire kindled, for we found plenty of wood. Some bark from a few trees that would peel, made a camp for shelter against the storm which drew closer and darker every minute. The coffee was made, the pone baked and eaten (though the writer's appetite for it was soon satisfied), the fire piled with wood, and we lay down to sleep a little, if possible, before the rain should come. A few hours we slept restlessly, while the distant thunder echoed among the hills.

About midnight the storm burst upon us. Long wreaths of cloud like ghosts floated through the trees; then the darts of the lightning pierced them, and the battle of the air had begun. Rain-drops sped through the trees like bullets, sheets of flame showed long vistas through the trees where cloud and lightning fought for the mastery; while high over all, from the peak of Thunderhead far above us, rolled the awful echoes of the artillery of the sky. For hours the battle raged, while we crouched under our frail shelter, awed to silence by the tempest about us.

At length the gray dawn struggled through, and the hosts of night and storm slowly retreated. We at last broke camp and went on our way, still under the influence of the new experience; and hereafter, whenever we hear the roll of the thunder, we shall think of that wonderful night on Thunderhead, and seem to see the majestic peak standing, stern and unshaken, while the spirits of Fire, Water, and Air fought about it the battle of the Giants.

The San Juan Mountains.

By Frederick H. Chapin.

Read June 11, 1890.

Viewed from the far east, from Sierra Blanca's savage arêtes, from the south over the sunny lands of the Mancos, or from the north on emerging from the cañon of the Gunnison, the sharp peaks of the San Juan ranges must ever fascinate the mountaineer.

The spell rested upon us as our train ran from Montrose up toward Dallas, when we caught glimpses of the peaks about Ouray, and on our left saw the castellated ridges of mighty Uncompahgre. The charm gained in force as we neared Mt. Snaefell, and traced high in air its varying form, which a haze of smoke seemed to magnify in altitude. The strange bluffs, the mesa formations, and the pastoral scenes in the valleys had interested us as we passed along through the country; but now, as we entered the precincts of the mountains, we were entranced with the view of the great cliffs and pinnacles which rise above the white snows that cling to the northern face of the dominant peak.

Glorious San Juan, how grand and picturesque are the scenes within thy borders!

Let us describe its surface and boundaries, glance at its history, and then ascend one of its grandest peaks.

It is a land of surprises for the traveller. From Uncompahgre Peak in the north to Conejos Peak in the south, both lying well within the system of the Sierra Mimbres, as the Spanish called the mountains, is a distance of some seventy miles. From Telluride on the west to Antelope Park on the east, is a breadth of forty miles. Within these limits are found peaks of granite, of quartzite, and of trachyte,— many-hued mountains of every imaginable form, from graceful dome to tapering spire. There are beautiful mountain tarns and foaming torrents, deep rugged cañons and peaceful valleys.[1]

This great uplift is not made up of a single range, or series of mountain-chains, but is composed of clusters of great peaks. The northern portion, which is called the Uncompahgre Mountains, is formed by two groups which lie about Uncompahgre Peak and Snaefell. Farther to the south are the mighty peaks which surround Silverton; and rising above Animas Cañon are the Needle Mountains. Still farther to the south lie the summits which go to make up the Concjos Range. Outlying groups, though properly considered as belonging to the San Juan system, are the San Miguel and the La Plata Mountains. The San Miguel district is described as very picturesque.[2] Mt. Wilson, the principal peak, is one of the most massive in Colorado. East of this mountain is the remarkable trachyte obelisk called Lizard's Head. The summit is 13,160 feet above the sea. From a noble pedestal, the pinnacle rises 290 feet, with a diameter at the base of only about sixty feet.

In among these several groups rise the Rio Grande del Norte, Animas, San Juan, San Miguel, Dolores, Uncompahgre, and other important streams, all except the first mentioned being tributary to the Colorado River; for the Continental Divide, which enters Colorado at about 106° 50′ west longitude, reaches its most western point 107° 35′ in the mountains east of Silverton, leaving most of the higher peaks of the San Juan ranges on the Pacific slope.

In early times the valleys in among these peaks west of the great divide were very difficult of access. From the east was found a route which crossed a pass to where Silverton is now located. The railroad now enters from the north, as far as Ouray, and from the south reaches within a few miles of the same point, running through Animas Cañon, through a country where it was long considered impossible to construct even a mule-path. This is, however, a remarkable feat of engineering.

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[1] "It is the wildest and most inaccessible region in Colorado, if not in North America." — *History of the Pacific States of North America*, by Hubert Howe Bancroft. Nevada, Colorado, and Wyoming, 1540–1888. San Francisco, 1890. Vol. xx. p. 495.

[2] "To the eye a more lovely region than that about these mountains cannot be found. The steeper slopes are covered by a dense growth of pine forest, and the gentler slopes below by fine aspen forests, interspersed with many park-like openings in which grass and flowers grow luxuriantly." — *U. S. Geological and Geographical Survey*, F. V. Hayden, 1876: Report of W. H. Holmes, p. 195.

It is interesting, even fascinating to read of the early history of the Spanish in New Mexico and Colorado, and to trace on maps their routes among the mountainous countries; yet it is doubtful if they penetrated into the heart of the San Juan Mountains. The best authorities seem to agree that Coronado did not enter even within the present borders of southeastern Colorado in his famous march eastward. When Oñate entered New Mexico in 1591, he established a colony on the Chama. From thence adventurers penetrated farther to the north, exploring for gold and silver; shafts of their ancient mines being found as far up as the Rio Hondo and Colorado in New Mexico, and even between the Culebra and Trinchera in southern Colorado.[1] Some fifty years later we learn of further exploration, "the object of which was to ascertain the true character and value of the minerals to be found in what is now known as the San Juan country. After these came the expedition of Juan María Rivera in 1761, which was prosecuted as far as the Gunnison River."[2]

In 1776 Escalante, accompanied by Don Joaquin Lain, who had been with Rivera, visited Colorado. He crossed the southwestern corner, journeying from Sante Fé through Abiquiú to Nieves on the San Juan River. Some of the names which he gave have been retained to this day,—Dolores, Piedra, Piños, Florida, and Las Animas.

In modern times nothing is known of the connection of Americans with this region till 1860. In that year John Baker led a party of mining adventurers from Pueblo. They entered the country from the south, from Tierra Amarilla, and went far up on the Rio de las Animas.[3]

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[1] Historical Sketches of New Mexico. L. B. Prince. 2d ed., 1883, p. 164.

[2] Bancroft, History of the Pacific States, vol. xx. p. 339.

[3] Ibid., vol. xx. p. 497. "Baker was a mountaineer of note. He had heard from the Navajoes and other Indians that the royal metal existed in the

Baker's Park, which has its name from the intrepid prospector, is one of the most interesting valleys in this locality. It is certainly isolated from ordinary thoroughfares, and in the early days was only reached by very high passes, one of these having an elevation of 12,600 feet, and another of 12,900 feet above the level of the sea.[1] "This, then, is the far-famed park, named after that daring leader of his little band, who lost his life within its bounds. . . . This is the *cul de sac* into which he and his men were mercilessly driven by the Indians in 1862. How many fell in the massacre, how many starved or froze to death, seems even yet to be veiled in mystery. But how the present survivors ever escaped, might well remain a mystery when we consider the great depth of snow that must then have covered these high mountain passes, and that at that date the country was perfectly unknown."[2]

How changed all this is, even since the explorations of the Hayden Survey! Then the country was very wild, though here and there in the parks and on the mountain-sides were seen the picturesque cabins of the frontiersmen. Now the log-house is giving way to the homely board structures, and the picturesque wickyups of the Utes and cabins of the squatters are being succeeded by the unpoetical and commonplace product of the saw-mill. This, we find, confronts us at Silverton. Surrounded by a noble array of grand peaks, — Mt. Kendall, King Solomon, Galena, Sultan, Bowlder, Bear, and other elevations, — in the village as a foreground are the most uninviting buildings. But in Colorado we must ever look for the picturesque among pastoral scenes, and not in manufacturing or mining centres. These settlers are not here

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mysterious upper regions of the Sierra Madre, proof of which was exhibited in ornaments and bullets of gold."

[1] The elevation of Silverton, in Baker's Park, is 9,202 feet. (D. & R. G. R. R.) U. S. Geolog. Survey. A Dictionary of Altitudes, compiled by Henry Gannett, Chief Geographer. Washington, 1884. In Bulletins of U. S. Geol. Survey, vol. i.

[2] Ann. Report U. S. Geolog. & Geog. Survey, 1874. F. V. Hayden, Washington, 1876. Report on the Topography of the San Juan Country, by Franklin Rhoda, Assist. Topographer, pp. 465, 466. Bancroft's Works, vol. xxv. "This historian gives the facts somewhat differently, stating that Baker lived to be a wealthy cattle-owner and to organize an expedition to explore the grand cañon of the Colorado. He was killed at the entrance to the cañon."

to enjoy the scenery, but to hew fortunes from the rocks, if possible. The same scenes meet us at Ouray; the long street running through the town is lined with plain buildings, many of them with sham fronts. These are occupied as stores and shops, among which the saloons predominate. Climbing above Ouray, however, one comes to log-cabins situated in most picturesque places. Snowy peaks rise over the hills which enclose the valley on three sides, and the little town below loses its crudity and looks very pretty.

The report of the United States Geological and Geographical Survey of the Territories for 1874 is one of the most interesting of all the many valuable works issued by the government printing-works. Of especial interest to the mountaineer is that part of the volume which describes the San Juan Mountains. The party consisted of A. D. Wilson, topographer, directing; F. Rhoda, his assistant; F. M. Endlich, geologist; and Mr. Gallup, who was for a short time attached as barometric observer. "It was one of the main objects of the San Juan division to inquire into the geological and mineralogical characteristics of these lodes, with a view to obtain some idea regarding their relations and value."

The story of the adventures of the party in their work above timber-line is told by Mr. Rhoda. If this officer's records could be resurrected from their burial-place in the volumes of the Survey Report,—volumes which are out of print, and inaccessible to the general public,— and illustrated in a suitable manner, and in a way possible at the present time, a book of surpassing interest could be made. He describes the ascent of Uncompahgre, Handies, Snaefell, Wilson's, Sultan, Rio Grande Pyramid, and other important peaks, many of which had never been climbed before. His account is replete with novel adventure and episode. Some of these peaks, as for instance Mt. Snaefell, presented some difficulties; but others, like Uncompahgre, were comparatively easy. The striking appearance of this latter peak had given it the name of being inaccessible; but instead of proving difficult, the first attempt on its lofty crags resulted in an easy climb. The party bivouacked at 11,900 feet, not far from timber-line, and though anticipating a hard day's work, found the labor light. When up 13,000 feet, they met a grizzly and two cubs, which were descending from the summit of the peak. They observed their tracks all over the final ridge of the mountain. In these trips the Survey parties met not only grizzly bears, but large flocks of big-horn, now so rarely seen in these mountains.

How the appearance of the mountains struck these early travellers, the following words of Rhoda will tell. They describe the view from Uncompahgre Peak, where they had their first experience with August electrical storms: —

> "From here, for the first time, we were able to see the great massiveness of the mountains in our district. To the south, the peaks appeared in great numbers, and in the distance appeared a group of very scraggy mountains, about which the clouds were circling, as if it were their home. Subsequently we found that they were most of the time thus enveloped. The high mountains near us covered the horizon from the east around by the south to the west. Nearly due west of us appeared a very high, sharp peak, which we afterward ascended as Mt. Sneffels, and just to the south of it another high mass, bearing in its centre a large flaring patch of snow; the culminating point of this was, later, Station 35, or Mt. Wilson.[1] Southeast of us, and about eight or ten miles distant, was a mass of peaks, filling the whole space between Lake Fork and Goodwin Creek, all of a bright red color. The highest of these points is over 14,000 feet above the sea. Ten or fifteen miles to the southwest was another mass of lower peaks of the same color; while in various places appeared mountains of white, yellow, and blue, all the colors being well defined and clear. They were caused by the oxidization of iron and other ingredients of the rocks.[2] Just before we left the summit, clouds came along, and we were soon enveloped. It was at this time that we experienced, for the first time in the season, the electrical phenomena which later interfered so much with the topographical work."[3]

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[1] Seventeen miles west of Mt. Snaefell.

[2] In Hayden's Report, 1874. See also Report of F. M. Endlich, geologist, p. 201, writing of the Rio Grande Pyramid: "Weathering with all the brilliancy that colors originated by ferric oxygen compounds can produce, it presents, in its variety of shades as well as its elongated pyramidal form, one of the most striking features of the valley. But a short distance northwest of this mountain are the sources of the Rio Grande, which for more than ninety miles flows through one continuous area of volcanic country."

[3] Ibid. F. Rhoda, p. 458.

It was on one of the red mountains where the survey party had a strange experience during an electrical storm. Their elevation was 13,967 feet. The phenomena commenced when the clouds were still at some distance, and the presence of something unusual showed itself by prickling sensations, and raising of the hair.

> "As the force of the electricity increased, and the rate of increase became greater and greater, the instrument on the tripod began to click like a telegraph machine when it is made to work rapidly. . . . The effect on our hair became more and more marked, till, ten or fifteen minutes after its first appearance, there was sudden and instantaneous relief, as if all the electricity had been suddenly drawn from us. After the lapse of a few seconds, the cause became apparent, as a peal of thunder reached our ears. The lightning had struck a neighboring peak, and the electricity in the air had been discharged."[1]

This disturbance continued for some time, the discharge only giving momentary relief. The strokes came so fast, however, that the two observers retreated from the summit, fortunately for them, — and none too soon, for immediately on their leaving, the crest of the peak received a bolt.[2]

It was the fame of Snaefell that attracted us to Ouray; and the train mentioned in the beginning of this paper brought us into this mining-town late on one September night. We could see nothing of the grand scenery about us, but we knew that far above the glimmering lights which shone from the camps of miners on the hill-sides, the great peaks were awaiting.

We had several addresses to look up, as it was our first visit, and we wished to obtain some information in regard to the mountains; but as name after name was read from our list, they were checked as sick or absent. The courteous proprietor of the Hotel Beaumont, however, on learning the purpose of our visit, and that our bent was mountain-climbing, informed us that Dr. F. M. Endlich was stopping at that inn. I was delighted, knowing as I did of his excellent work as one of the geologists of Hayden's staff, and being sure that no man knew the country better. We were presented to him, very kindly received, and made still more joyful by being invited to ride with him high into the range the next day. The object of his journey was to start some delving operations at the Yankee-Boy Mine.

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[1] Hayden's Report, 1874. F. Rhoda, pp. 456, 457.

[2] Compare "Mountaineering in Colorado," p. 31, Long's Peak; also APPALACHIA, vol. v. p. 286: "Ascent of Mt. Shavano," by C. E. Fay. In this case, while on Shavano, two mountaineers went through the vicissitudes of a severe electrical storm. One of them escaped the unpleasant sensations, from the fact that he was insulated, caused by wearing rubber-soled tennis shoes.

The day following we were off at nine o'clock, riding up the Snaefell Toll road, through a magnificent cañon above a roaring brook. All along our morning's ride were beautiful views of peaks and valleys. The road is well built, and skirts the sides of the mountain high up on its flanks. After riding about two hours, the way turns to the right; and high above us, blocking the end of the valley, we saw Stony Peak, a beautiful diorite mountain. We little dreamed that we should reach a point beyond it that day. Its solid, rocky slopes give it the appearance of a greater altitude than it really attains. A half hour farther on we came to a place under Potosi Peak, where a log-house had stood for six years, but which was carried away by an avalanche a year after its desertion. On the sides of the mountains a little below this point, are grand exhibitions of havoc wrought by avalanches. Earth-slides had ploughed a way through great forests in broad, regular sweeps, leaving the ground clean and bare of trees.

At 11.30 we reached a ranch or mining-camp (Porter's), which is put down on the map as a town.[1] On the opposite side of the river is the entrance to a tunnel, which is eight feet high and nine feet wide. It has already been extended 1,300 feet into the heart of the mountain, will strike the shaft of the Virginius Mine at a depth of 1,900 feet, and will be 6,000 feet long.

Now the peaks on the left showed splendid towers and sharp pinnacles. Dr. Endlich informed us that the ridges had proved too jagged to allow of a survey line to be run over their summits.

The wagon-road ends at Porter's, and burro and mule trains

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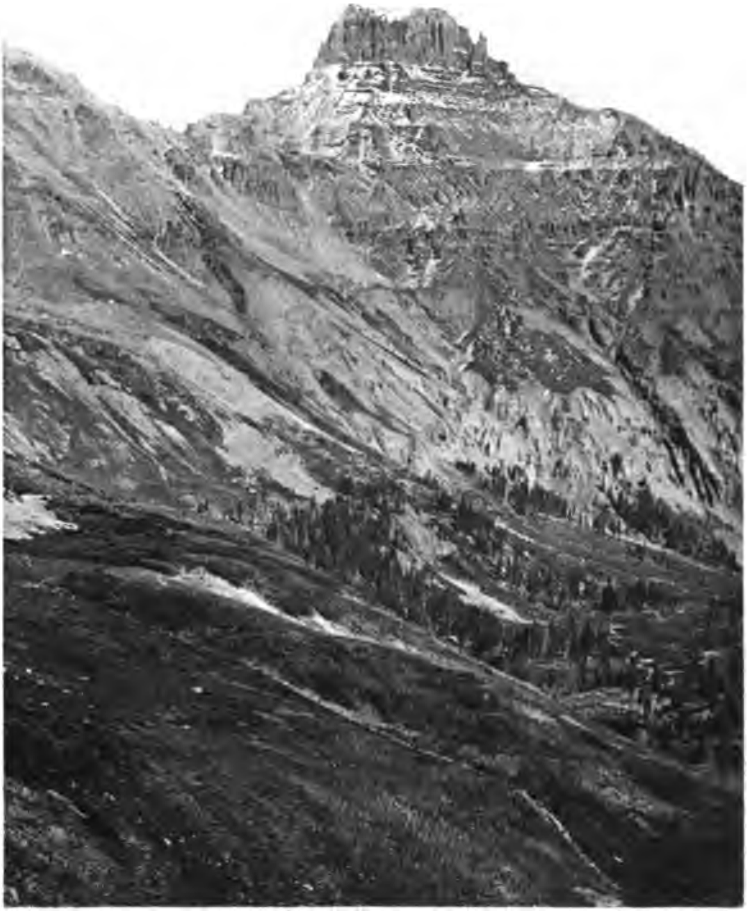
[1] "Mt. Sneffels."



BOSTON PHOTOGRAVURE COMPANY.

POTOSI PEAK.

From a Photograph by Frederick H. Chapin.

do all the packing from this point up and down from the Yankee-Boy, Virginius, and other mines. They also are kept going all the distance from Ouray.

At 11.45 we left the more travelled road which leads to the Virginius Mine, and followed a trail leading to the Yankee-Boy. At twelve we passed the "Ruby Trust." Here, in a little valley where much grass grows, is located a milk-ranch. The demand from the mining-camps has called such an industry into existence, and a dozen or more cows pick a subsistence among the black willows which grow by the torrents. Passing these pastoral groups, we left the tinkling of cow-bells, and rode through interesting scenes. On rock-beds by the trail were marks of glacial scoring, and high above us on the peaks to the right were splintered crags. One spire had a big hole in it, through which the blue sky showed.

About noon we reached the Yankee-Boy camp, which consists of two very pretty log-cabins near the stream. Here Dr. Endlich rested for a short while, to direct the work of some miners who were about to open a shaft. We were not long delayed, however, but continued on and up. At 12.45 we reached timber-line, and at 1.15 the summit of Treasury Hill (elevation 12,125 feet), a grassy alp, from whose top is obtained splendid panoramic views of the encircling snow-peaks. These snow-caps occupy nearly 300° of the horizon, and at the observer's back is the dark wall of the Snaefell group. We spent much time in taking photographs, securing sixteen pictures; six of these represent the panoramic view.

Treasury Hill is well suited for the location of a mountain inn. It is easy of access, for a good road could be built to the summit. There is plenty of water to be found, for the turf is springy. The region is very attractive. The many unnamed peaks are marked by a grace and beauty peculiar to themselves. But for one reason, their charm to the mountaineer would be unequalled by any other range in the State; but the ever-present prospect-hole found up to an elevation of 13,000 feet gives the traveller a feeling that he is not in a very wild country, and that he has been preceded by many. The appearance was so different from what I had seen in other remote parts of the Colorado ranges, that I was struck with it on my first trip from Ouray. This leads me to emphasize a statement that I have often made before, that wherever minerals do not abound in the higher Rockies, there, when off from trails, the traveller may rest assured that few have been ahead of him, and in many cases he can well feel that he is a pioneer. But here, at the base of the final cone of Snaefell and the adjoining peaks, we observed prospectors' openings, and stakes marking claims were set in many places on the grassy slopes of Treasury Hill.

Looking to the south of Treasury Hill, one sees a grand peak which towers up from a placid glacial lakelet. Sweeping down from near the summit come great ridges of sand and debris which seem to show the path of an ancient glacier. The lake is in a deep hollow, and is a wild spot. Rising above it on the west, are the serrated ridges of Snaefell. When the waters are calm, these pinnacles are mirrored in the lake, and the effect is beautiful. One of the finest photographs which I ever obtained in the Rockies was secured at this place.

Leaving Treasury Hill at 3.15 P. M., we reached Ouray at dark, riding a part of the way at a lively gait. When the little town came into view, it was lighted up; and high on the mountain-sides around, little glimmerings showed from the mining-camps like answering beacons.

One result of our preliminary excursion was the making the acquaintance of one Alexander Taylor, a contractor and prospector of Ouray, who was at that time engaged by Dr. Endlich. He had been upon Snaefell six years before. He offered to go up this peak with us, and help carry our photographic apparatus.

The morning following, we spent in climbing steep hillsides about Ouray. This valley is in a hole, if ever any town was. It is built on the bed of an ancient glacier, above the terminal moraine. It is surrounded on all sides but the narrow entrance to the north by steep wooded slopes, which one must ascend but a short distance to catch sight of the noble peaks which lie back of them.

In the village we took pictures of burros and mule-trains, and on the hill-sides views of log houses and cabins. While among the hills, tremendous blasts were heard above us, and rocks came crashing down the slides, and fainter reports reverberated from the opposite mountain-slopes. All day long in our ramblings, we realized that the miner was at work in the mountains, and shaft-holes were seen everywhere high up on the cliffs.

There are beautiful trees about Ouray; but the axe is already at work, and the town-folk must look out for the future, before it is too late to preserve the forests.

In the afternoon we rode on horses to Porter's Camp. This ranch, as I have stated, is located on the map as a village. There is a store, over which is a loft in which are several beds; one of these was, put at our disposal. An addition to the building is used by the proprietor as a dwelling-place. Next the store is a small house where meals are served to the mule-drivers and miners. Besides these are a large barn, and a long, low building which is used for the storage of ores. This constitutes the town of "Mt. Sneffels." The distance from Ouray, by the road, is seven miles; the elevation above sea-level is about 10,950 feet, or 3,310 feet above Ouray.

We enjoyed our stay at this mining-camp, watching the mule and burro trains and talking with the miners. A little way above the camp we were the observers of an approaching line of pack mules, all loaded with ore, from the Virginius Mine. One of the animals took it into his head to cross the stream, and wander among the scrub growth upon the opposite side. Several of his companions followed, and the drivers in endeavoring to "round them up," caused a general stampede, and as a result a couple of packs became loosened, and trouble was in store for the tired drivers. The burden of one mule revolved to a position under his belly, and naturally a furious spell of bucking and kicking resulted. It seemed as if that mule would destroy himself in his stupidity. He thrashed around till the ore was gotten rid of, and finally so entangled himself in the ropes, cinches, and saddle-gearing, that he fell in the middle of the stream, and lying on his back continued to kick the air.

Later, at the camp we were treated to an exhibition of horse-training. A cow-boy who had left the joys of ranch life to spend his days in holes in the earth, undertook to mount and ride a bucking broncho, that had hitherto kept all venturesome riders at a distance. A worse place could not have been selected in which to attempt to curb the spirit of such a beast. There was some commotion and excitement, at the start, while the horseman endeavored to get astride the steed: for he was driven back by the mustang, who let fly with hind legs, his heels making a sort of quiver and snap as they reached for the intended victim. Later efforts were more successful, and the trainer was soon firmly seated. The enraged animal snorted, plunged, and reared, but was unable to throw the rider, and in a fit of desperation took the bit between his teeth and dashed away. Open clear space was limited, and in a blind manner the mustang mounted a pile of lumber, and then crossed a stack of logs in among which we expected to see him break his legs and dash his rider among the timbers. Coming out of this difficulty in safety, he then took to the woods, where the cow-boy risked being struck off at every moment by the branches of the forest. He finally guided him into the road again, where horse and rider came down together in the dusty highway. Picking himself up, the broncho dashed off; but the cow-boy clung to the end of the rope, and was dragged through the stream, — a mountain torrent which ran near by. He held to the fiery steed; and the on-looking miners and mule-drivers joining in, the combined weight of so many strong men checked the onward motion of the galloping horse, and he was brought to a stand-still. One of the miners now stepped forward, took off his coat and bound it around the head of the broncho; and after a little more fun, the beast was cowed, and trotted up and down the dusty road at the beck of his new master.

I had had some experience with bucking bronchos. Once in the northern Rockies I used such a beast, the kind that must be saddled and unsaddled with the greatest of care. One day, after a long ride, I dismounted, opened my camera box, which was strapped to the saddle, and carefully removed the instruments; but the animal, looking around with his bad eye, saw the cover of the box projecting from his sides, and commenced a terrible dance. Levels, compass, diaphragms, barometer, tripod, and plates were distributed far and wide, so that we were able to follow the trail by the scattered remains. Dashing between two trees, without considering the consequence, the broncho pursued his way. The box was knocked to pieces, and not till several searches had been made did we find the cover. Again, in another district, I rode an animal that in his plunges would land my nose on the soft place on the top of his head, between his ears: but in all my experience I never saw such a bucker as this one in the San Juan Mountains.

During the evening, at the supper board, and in gathered knots of men after this meal was despatched, the conversation was about the cow-boy's feat; and his prowess was extolled on all sides.

One feature of miners' life strikes the novice as peculiar, and that is the amount of swearing heard on all sides. Profanity, if it ever had any use, has lost all meaning and force in the vocabulary of the mining-camps. The most trivial expression is prefaced by a volley of oaths; the more commonplace the subject, the longer the string. If a man is examining his boot, and discovers an abrasion, the poor boot has to take it. The men we met seemed a jolly, plucky lot of fellows, — men who use oaths if they chance to stub their toe, but who would very likely lose a leg without opening their mouths.

So late in the season, the mornings were so dark and cold that we could not make very early starts. On this occasion we did not leave Porter's till 6.50. As on the day before, we passed interesting cabins and funny burros. Of the presence of one of these comical animals, we knew nothing except that two ears were sticking up over a ridge.

At the Yankee-Boy camp, we found Taylor waiting for us. He followed us on foot, and we gained the summit of Treasury Hill at 8.30 o'clock. Here we fastened our horses to bowlders, divided our packs into three parcels, and made for a gully which leads up to a notch between Snaefell and a peak to the east. In a few minutes we were on a great bowlder-field. On the opposite side of it we observed a couple of badgers among the rocks. Crossing the maze of huge blocks, we scrambled over a big moraine and descended into the trough. Above us loomed the crags of a splendid arête. We left part of our packs and some of our plate-holders at this point, and started on our journey skyward. The views began to grow more and more imposing, and the ascent steeper. The savage arête fell below us, and we could look over its spires to distant ranges. At 10.30 o'clock we reached the notch (B. 13835), and looked down in a direction to the northeast upon a branch of the south fork of the Dallas River. We rested here for ten minutes. Turning directly to the left, or northwest, we entered a second gully, which was about thirty feet wide. Steep walls rose above us on both sides. We climbed in this narrowing cañon for thirty-five minutes, when we gained a second notch which was filled with snow. Carefully climbing the cornice of ice, we obtained another fine view into the Dallas Valley.

Now some uncertainty entered into our work. The miner tried to get up a gully by which he thought he had ascended six years before. He did not succeed. I tried another, which looked feasible, and after ten minutes' work reached a ledge from which I saw an easy route to the summit. Our only trouble now was from loose rocks: the whole summit seems to be falling to pieces; great blocks rest on insecure foundations, and the slightest disturbance sends them bounding down the mountain-side. I narrowly escaped a serious accident, by the giving way of what I supposed to be a firm rock, and a second and third clutch did but start other unstable stones to add to the clatter begun. A fourth grab, however, stopped my fall, and I came out with no other harm than a few scratches. At the present time, with no particular route laid out, there is just enough sharp climbing on the peak to make the ascent interesting; yet every side of the mountain appears to present the same difficulties. The first climbers seem to have had a hard time of it. Rhoda speaks of it as the "hardest climb of the season" (1874), and further states that "the first half of the height was very steep, but neither so tiresome nor so dangerous as the last half."

We reached the summit at 11.45 o'clock. The air was clear, though the smoke of forest-fires in Montana, which a continued north wind had brought into Colorado, interfered with distant views to the north. There was no wind during the one and three quarter hours which we spent on the peak. It was also warm and comfortable.

After a short survey of the surrounding country, we took six pictures from the highest rocks. The negatives, when developed, proved very good, but would have been much finer but for the lack of cloud effect, and for the hazy aspect of the sky. This fault followed us all through the San Juan peaks, except about Silverton.

Snaefell has a good top, just enough space to move around easily and enjoy the view in every direction. Before leaving Ouray, we had laid out on a card-board compass bearings and distances of all important peaks lying within a hundred and twenty-five miles of our mountain, and thus we were able to identify many of the visible points.

Looking immediately down upon the north side, one sees a deep gulf which is described by Lieutenant Rhoda in Hayden's Report. This recalls the manner of naming the peak. Dr. Endlich was standing in the abyss with one companion, who compared it to the great hole described by Jules Verne in "Journey to the Centre of the Earth." Endlich agreed with him, and pointing to the great peak above, exclaimed, "There's Snaefell!" Thus the peak got its name, though it is pronounced by the people of the valley as Sneffels, and is so written on the maps, and in the tables of the Coast Survey. So it will be part of the effort of this paper to put on record the true designation, named after the Icelandic mountain Snaefell, lest erelong the grand summit be called "Sniffels." One will observe that already the inhabitants of the valley have a strong tendency towards this pronunciation.

Mt. Snaefell is admirably placed for a view-point. On the north is the valley of the Dallas River, stretching far down to the mesa country about Montrose. To the west is Lone Cone, the San Miguel Mountains, Mt. Wilson, Dolores, and Lizard Peaks. To the east, the Uncompahgre group, with its marvellous castellated ridges, the main peak overtopping all, — a grand pyramid in form. To the southeast the peaks about Silverton, and back of them the sharp points of the Needle

Mountains, and far beyond, many peaks unrecognizable and unnamed. In the distance, south, we made out the La Plata Mountains, with Hesperis Peak, which dominates a valley which we hoped to know better in a few days. Yet we needed not look far to see the most beautiful sights. Near to our station were peaks unscaled and unnamed,—peaks with towers, and peaks with spires; mountains with graceful and beautiful forms. Down at our feet, on the north side of the peak, were several large lakelets, and we could see the upper edges of the great snow-field on the north side of Snaefell, the one that shows so beautifully from the Dallas Valley. It was a disappointment that our time did not allow us to investigate this ice-expanse, explore it, and make photographs in detail, as no one has been near to it, except, possibly, a few prospectors. Mr. Kedsie, the State geologist of Colorado, told me, when we were in Ouray, that he imagined that this snow-field might prove to be a miniature glacier. We observed one crevasse in an ice-stream miles away, high up on another mountain to the west.

The north face of Snaefell is very ragged in appearance, a number of jagged arêtes leading from the summit. Notwithstanding our interest in the perpetual snow-fields, one of the most striking points of interest in the view was the effect of newly fallen snow; white bands, as ribbons, stretched across the face of lofty towers, and in some cases reached for miles in parallel lines along whole mountain-ranges, maintaining equal elevations. This is accounted for by the fact that the trachyte rocks lie in benches, these benches running across the face of the peaks, and the snow thus finds lodgment. Domes far and near were all pure white.

We left the summit at 1.25 P. M., stopping to take two views on the difficult ledges. Exploring for a new route, we struck a gully, which was so filled with ice and loose stones that we were obliged to descend singly to avoid the danger from falling rocks. We hurried down the big gulch by which we had ascended, and gained the base of the arête where we had left our plates at 2.50 P. M. Here we had some more photographing, and reaching our horses at 3.45, arrived at the cabins at 4.15.

An Ascent of Sierra Blanca.

BY CHARLES G. VAN BRUNT.

Read Dec. 18, 1890.

MY thanks are due Professor Fay and Mr. Edmands for my acquaintance with Sierra Blanca, for it was at their invitation that I joined them in their unsuccessful attempt to reach the summit last July. But what I then saw of the magnificent mountain was enough to fire me with an unquenchable enthusiasm to stand upon its topmost pinnacle and traverse its glorious arêtes. Accordingly, I visited it again in September, in company with two other enthusiasts; and two of us then reached the summit.

My companions were Dr. William A. Bell, an English gentleman, who was one of the pioneers in Colorado, and who took much interest in our July attempt; and Mr. R. F. Penrose, a young man who has had experience in the Alps.

We had intended to make our expedition early in September or in the latter part of August, during the brief period between the cessation of the daily showers — apt to be dangerous storms above timber-line — and the rapid shortening of the days. But the rainy season ended with a long-drawn-out storm from the south, which, though at no time violent, completely veiled every mountain in the State for several days. This delayed us for a week or more, and when the time came forced us to race with the daylight; but then we were amply rewarded by weather apparently made to our order, so perfect it was.

My two companions and myself left Colorado Springs at an hour well known to the mountaineer, 2.20 A. M., on Tuesday, September 9, for our destination by rail, — namely, Fort Garland, a quondam United States military station and shanty hamlet, situate in the San Luis Park, just west of the Veta Pass, and eight or ten miles south of the heart of the Sierra.

We arrived at Garland about the middle of Tuesday morning. The business of the place, outside of Dr. Bell's large land interests, which centre at the "office" in the old adobe fort, appears to be loafing and, incidentally, agriculture and ranching. Dr. Bell owns all the provisions, etc., stored at the fort; and the whole place moves at his bidding. Accordingly, we were royally treated, and supplied, through his agent, Mr. Meyer, with a most lavish outfit of provisions and camping utensils. Here I must say that to this generosity of Dr. Bell in providing us with such excellent fare during our stay in camp is undoubtedly owing an essential part of our success. Lucky is the mountaineer who knows a Dr. Bell!

While the dirty but picturesque Mexicans are loading our effects upon a light, rickety wagon, consisting mostly of brake-gear, let us take a look at our mountain, and talk over our plan of attack.

The view of the mountain from Garland is that shown in Jackson's photograph,[1] which, doubtless, many recollect. There three, or rather four, peaks appear in a row. The one on the left, or westernmost, and undoubtedly the finest of the lot from Garland, is known as the West Peak. It is the one whose summit my companions of the July trip reached in 1888. They have no reason to feel chagrined at that failure to reach the main summit. The peak is a noble one. Next to it in order comes the middle, or main summit, called Blanca Peak. From Garland this summit is not particularly fine. Next comes the East Peak, about one thousand feet lower than Blanca Peak; and last, a low spur-like summit, which Mr. Scudder has kindly christened for us "Blanca 4." The Main Peak stands a mile and a half north of the East Peak, which, with the other two, lies in a straight line running a few degrees north of west. Long and formidable arêtes connect the East and West Peaks with Blanca Peak, and a short col connects "Blanca 4" with the East Peak.

There happened to be in Garland at the time of our visit a gentleman by the name of Kellogg, a surveyor. Some years before he had surveyed the Trinchera Grant, within whose limits the Sierra Blanca lies, and he knew the mountain well. He told us of the Hamilton trail,—an old mining trail, long since abandoned, which runs quite to timber-line on the east face of "Blanca 4," and thence down to a mine in the gulch toward Old Baldy. A fairly good road, we were told, — and we knew what it meant, — led from Garland up the Cottonwood Creek to a point seven or eight miles distant where the Hamilton trail leaves the stream. This route we decided to follow to the tree-limit. It is not the shortest in respect to distance, but I was pretty sure that it would be the quickest. For from a bit of experience we had had with this trail on our descent of the mountain in July, I knew that it afforded at least an easy passage through the dense chapparal of aspen; and all who have climbed in Colorado know what an unmitigated nuisance these jungles are when one wishes to make good time. Once above timber there is less choice of routes; for there the numerous extremities, so to speak, of the mountain are united to the body and limbs. Our course lay over "Blanca 4," across the col to the East Peak, and then along the great arête to the Main Peak.

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[1] See APPALACHIA, vol. v. plate xiv.

Our plan, then, was to drive up the Cottonwood to the entrance of the Hamilton trail that afternoon, the day of our arrival; there we should make camp. Next day we could ascend our peak, and get back to Garland the day following. This plan we succeeded in carrying out.

We set out from Garland at about one o'clock, five strong, packed, with our "duffle," into two wagons, each drawn by a strong team of horses. The two additions to our party were a Mexican and a man picked up at Garland, Brennaman by name, who claimed to have been to the summit some two or three years previously. He went with us in the capacity of "guide;" but he was like all Colorado "guides," so called, for we had to show him the way. He did not reach the summit with us. The Mexican, Juan (the reader will excuse me from transcribing his back name) went along to take charge of camp, — all but the cooking. Penrose did that; happy is the man who has a Penrose for a cook!

The road up the Cottonwood was, as we had surmised, no road at all, but merely a place where you can drive in a light wagon by dint of getting out and walking. Nature built that road; and she was never cut out for an engineer. The water-bars were mostly gullies of the depth and proportions of a drain-pipe trench; some of them were regular cañons. When we came to one of these, we three would get out and stand aside to see the fun. The Mexican drove us; he was a stolid fellow. He never smiled, or spoke, or moved if he could help it. The way he stuck to his wagon was simply heroic; he did not get out of his seat once — on purpose. When he came to a gully he would set his brake, which occasionally scraped a little on one of the wheels and did not touch the other at all, and go ahead. The horses went at it like old hands; but the wagon always rolled down unrestrained, and brought up with a jerk against the further side of the gully. Then the internal economy of the vehicle would be painfully disturbed, and the Mexican would promptly take a seat on the floor, with the carefully handled rifle-cartridges underneath him, and the seat-cushions on top. Of course, we smiled — audibly. But Juan was absolutely indifferent. He did not even swear; he simply picked himself up again.

We reached camping-ground about sundown. It was a pretty spot on the banks of the creek, with long, fresh grass filling up the spaces between the trees. While supper was being prepared, I climbed the ridge above the brook to look about me. I could follow with my eye the clean swath cut by the Hamilton trail through the dense timber for two or three miles, — nearly to timber-line. There was every promise of a perfect day on the morrow. Toward the south the prospect was very beautiful. We were some 1,400 feet above Garland; below us the broad expanse of the San Luis Park, with a bit of the Culebra range rising beyond, was framed between the converging slopes of the dark cañon where our camp lay. The park glowed yellow and golden in the soft light of the Colorado sunset. Tortuous dark-colored threads wound through it where the cottonwoods fringed the streams. The lower slopes of the Culebra range, some twenty miles distant, with the gorgeous autumn colors of their aspen forests blended in the dying sunlight, looked like a soft reflection of the flaming western sky, which was hidden by the southern spurs of the East Peak towering above me. It was a subject for a Turner. The column of smoke rising from the dusky ravine below me reminded me that there was work for me down there, — or, rather, that supper was ready.

We did not pitch our tent that night, but made up our beds on the open summit of the ridge above the stream, far from the fire. In a climate like that of Colorado, when there is little wind and when you have plenty of blankets, it is better to do this than to sleep in the shade near a fire; the air is dryer and purer. It was a perfect night, though frosty, and we slept well, — too well, in fact, for we did not get started until 7.15 the next morning. We ought to have been at timber-line at six; but inasmuch as my companions held me responsible for the success or failure of our venture, I did not say what I thought of myself, but resolved to expiate by hard work my neglect to wake them. We shall see the result.

At 7.15, then, we bid a silent farewell to the Mexican, and began our work. The old trail through the piñons and aspens was fascinating. We made fair progress, and reached timber-line at about 9.30. At this point the view of Blanca Peak and the arête we were to traverse, was superb. It is evidently somewhere near here that Mr. Chapin took the beautiful photograph which figures as a frontispiece to APPALACHIA for May, 1889; that does not, however, show the arête I speak of.

Thus far the climb had been easy, but now the hard work began in earnest. The only objection to this route, that I can see, is the climb from timber to the summit of "Blanca 4," which now lay before us. It is decidedly dangerous, and especially bad from the fact of its coming early in the day, and thus, of course, at a time on the descent when one is more than ever in want of easy work.

The slope here was an unusual combination of irregular, splintered crags and very loose, unsorted débris, varying in coarseness between fine gravel and bowlders weighing many tons. I did not look at it carefully from a geological standpoint; but from my memory of the place, I should say that the débris was glacial, certainly not frost-work, and that it was deposited thinly over a complicated outcrop of granitic dykes which form the crags. The gravel lay in steep slides. When we stepped upon it, it would run down hill like melted tar, starting large rocks from above, which would roll and slip heavily past us. Had they struck us, we should probably have accompanied them over the cliffs below. After a little experience we avoided these dangerous slides as much as possible, and kept to the crags, which afforded a firmer though often precarious footing.

Here Dr. Bell had to give up, on account of giddiness. He determined to spend the day exploring the titanic amphitheatre which lies in the angle between Blanca Peak, the East Peak, and " Blanca 4." We almost envied him; for all who have seen that tremendous place consider it, in its rugged, savage grandeur, second to none in Colorado. Mr. Penrose, the " guide," and I kept on, and reached the summit of " Blanca 4" at about 10.30. The climb from here across the col to the East Peak was short and easy, but interesting. On the way we passed the highest point reached by Professor Fay and the writer in July. It all came back to me like a flash, — how, feeling miserably blue, we had stopped to rest, before retracing our steps, crouched under the dripping rocks, with the cold, stinging hail and rain beating down upon us, and forming, in the hollows of our rubber ponchos, little puddles, which would overflow and treacherously trickle inside, adding their chill to that of disappointment. Now all was different. The day was perfect; not a cloud flecked the sunny sky. We were in high spirits, and just getting limbered up to work.

On the north side of the col there is a magnificent precipice overhanging all the way from brink to base. We rolled rocks over as big as a man's body; and when they struck, and bounded down over the hard slope of snow and ice below us, they appeared mere specks.

We reached the top of the East Peak at 11.15, three quarters of an hour after leaving " Blanca 4." Then I realized how very far we were from success in July. We saw from this point, for the first time, the whole length of the great arête from the East Peak to Blanca Peak. It is nearly two miles long, " a marvel of narrowness and sharpness," and inexpressibly rough and uneven, on both a large and a small scale. From where we stood it was a grand sight. It curves out toward the southwest slightly. This curve seems to have had the same effect upon the great precipice, which forms the inner wall of the arête, that a similar curve on the rails has upon the inner walls of the cars traversing it. I mean the precipice leans, or overhangs, more or less, as the curve of the arête is greater or less. The effect of this interesting construction is to give a beautiful appearance of airy, firm motion to the ridge; but it also conveys an uneasy suggestion of mighty instability when we consider that our titanic train of granite is standing still, and that our task is to clamber along its broken and splintered eaves.

But notwithstanding the formidable appearance of our intended route, we held a preliminary jubilee on the East Peak, and proceeded to dispose of a portion of our lunch. We found in a cairn on the summit a sardine box, containing the records of a party on the way to the summit on September 2, 1888. There were three of them, and they apparently had doubts of the safety of the work before them; for the short notes of time, etc., ended with, "And may the Lord have mercy on our souls!" A moment's consideration made us suspect that this was the Harper's Weekly party, which succeeded in reaching the Main Peak on the same day that Professor Fay and Mr. Edmands suffered their first repulse by a different route. This conclusion was verified by full records found on Blanca Peak.

We delayed on the East Peak for half an hour. This was imprudent; but the time passed, as time is peculiarly apt to pass above timber-line, before we knew it. At 11.45 we "girded up our loins" for the long struggle to the great summit, Blanca Peak.

This, though perhaps the hardest part of the whole ascent, was interesting and exhilarating in the extreme. As I have said, our arête was very ragged and narrow. It is studded all the way along with knobs with sharp precipitous depressions, or notches, between them. These knobs vary in size from a small hummock, about large enough to sit upon uncomfortably, to a hill, or rather a slice of a hill, twenty or thirty feet high from its base at the bottom of the notches which flank it. The southwest side of the arête falls off sometimes perpendicularly, and always so steeply as to make travelling over its face precarious and slow. The northeast side is an overhanging precipice all the way. The sheer drop was never, I think, less than fifty feet, and was generally not far from a thousand. If you fell off anywhere from its crest, however, you would not come to a dead stop until you reached the bottom of one of the green, ice-bound lakelets on the floor of the great amphitheatre, some two thousand feet below.

Our path was limited to the narrow crest of the arête all the way. In places it was so sharp that we had to straddle it. Ice here would be very dangerous; but there is never ice on the arêtes in September, among the Colorado Rockies. The notches between the knobs always required great caution; and rapid progress, even when we met an easy place, was a continuous balancing feat, requiring constant vigilance and untired muscles. A sufferer from the "reverse impulse" would be very unwise to attempt Sierra Blanca. There is a downward slope from the East Peak almost to the foot of the main peak. It is very irregular, to be sure; but the general tendency is downward. How much, I cannot say; for I had no aneroid.

The views we had of the West Peak were very grand. That is truly a great peak, one of the very finest in Colorado. It is flanked on all sides by majestic precipices, and the arête connecting it with Blanca Peak is as terrific to look upon as it is said to be to traverse.

Near the foot of the main peak we found a sunny corner, where we were sheltered from the frosty breeze. There we had our regular lunch. We should have liked to put it off until we reached the summit, because we should have had just so much more time there; but food you must have when you need it, and we needed it then. This delayed our progress between half and three quarters of an hour; but we started off again feeling far fresher than before. Our party was now reduced to two. Our doughty "guide" had turned back some time after we had left the East Peak.

The steep side of the Main Peak now lay before us.[1] It consists of exceedingly coarse frost-débris, with occasional crags, — not the easiest or safest of climbing; but we felt so fresh after our rest, and so pleased at the approach of success, that we made quick work of it; and after three quarters of an hour's climbing, at half-past two o'clock we stood upon the topmost crag of the Sierra Blanca, 14,483 feet above the sea, on the highest point of the Rocky Mountains, and, with one or two exceptions, the highest in our country.

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[1] This is the slope seen in profile on the left side of the peak in the photograph by Mr. Chapin, APPALACHIA, vol. v. plate xiii.

It is unnecessary to state what was the first thing we did. It is enough to say that we are both young and foolish, and that anybody looking at us through a telescope would have smiled, but sympathized. The space on top, however, was too limited and the altitude too great for us to indulge in many "monkey-shines." Accordingly we calmed down, and proceeded to "take in the encircling vastness."

The summit upon which we stood was a model one. It was nowhere more than eight feet across, and was strewn with fine débris of a very hard, black rock. On every side the ground sloped away with increasing steepness, and a stone tossed off towards the east "would fall half a mile without striking."[1]

The view, I think, is far more beautiful than that from Pike's Peak; but it is not so fine as that from either Lincoln, in the Park range, or Elbert, in the Saguache. I should hardly climb Sierra Blanca for the distant views; but the views of the vast, intricate mass of the mountain itself were very fine. The arête we had just crossed was the finest of the lot, and looked extremely formidable. I looked with especial interest, however, at the one between our position and the West Peak. It bears an ugly reputation; and from what I could see of it, I do not wonder. So far as I know, Kellogg is the only man who has crossed it. He considers it excessively dangerous, and characterized the knob near Blanca Peak as "horrible."

To the north the beautiful Sangre de Cristo range, of which Sierra Blanca is the crowning point, sprang away peak after peak, all buttressed by just such arêtes as we had traversed. Twenty-five miles distant there rose from this range two mighty peaks, side by side, — Humboldt and Crestone. Humboldt was shaped precisely like a thimble, and appeared as inaccessible as the outside of Bunker Hill Monument.

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[1] Report of F B Rhoda of the Hayden Survey of 1875.

We looked straight up the broad Wet Mountain valley, between the Sangre de Cristo and the Greenhorn range.[1] At the head of the valley rose Pike's Peak, more than ninety miles away. The graceful Spanish peaks and the Culebra range with its two great summits, Trinchera and Culebra, — a sort of continuation of the Sangre de Cristo, — filled up the space to the southeast. The vast San Luis Park occupied the rest of the scene. There were lakelets in every direction. Some were above timber-line, partially frozen. Those farther down had thickly wooded shores. The southern section of the Park appears finely watered and fertile.

We found the full records of the Harper's Weekly party in a bottle. It was there stated, among other things, that this party had abstracted records of previous ascents from the Hayden Survey cairn on the summit, and had taken them off for publication. They should not have done this. We left theirs undisturbed, and added brief records of our ascent. We had three living companions in that lonely place. Two little birds hopped unconcernedly about our feet; they seemed to be searching for something in the light, fresh snow that lay in crannies sheltered from the wind. A magnificent white-headed eagle circled around above our heads. That sight took us down somewhat.

At 3.15 we started on our way down; leaving, I regret to say, much undone in the way of observation that we wanted to do. We had already lingered too long on top for prudence; but I was prepared to pay the penalty for our tardiness in the morning. The gulch between the two great arêtes was still bathed in bright sunlight; but we foresaw that by the time we had reached the East Peak again it would be in deep shadow. Our descent would take fully as long as our ascent; and that had taken eight hours from camp, including stops. But I thought that if we could at least reach timber before dark, we could follow the trail back to camp without great difficulty. But we should be lucky if we could make such time to timber. We had no desire to descend that ugly bit on "Blanca 4" in the dark,—indeed, we were confident that it would be quite impossible to do so; and a night above timber-line at that time of the year, with no fuel or even wraps, was not to be thought of for a moment.

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[1] That is, the *Cuerno Verde,* = Green Horn. Why not keep the Spanish name? "Greenhorn" is ugly, and gives a wrong impression.

Urged on by these considerations, we started off across the arête for the summit of the East Peak; but for certain reasons, we did not get along as fast as I should have liked. I felt very anxious about our time, and anxiety is a bad thing on a dangerous arête; it makes you hurry when you ought not, and has a depressing effect upon the spirits and nerves. And there are few things less enlivening to a belated mountaineer than to have to go up a great deal during the descent from a great summit, as we did here. All the way over we anxiously watched the ragged shadow of that savage Western *cuchillo*, as it crept relentlessly across the gulch, and up the wall of our arête towards our feet, menacingly warning us to hasten our steps. And it was not unheeded; but as we had foreseen, shadow had already filled the desolate ravine, when at length, at half-past five, we stood upon the summit of the East Peak. The climb had taken us two hours and a quarter from Blanca Peak, which was the same time we had made in the opposite direction.

Now darkness was coming on apace,—a September twilight is but short,—and we still had "Blanca 4" to descend. I thought for a moment of taking the easy route to timber that we had followed in July; but that would lead us far out of our way, and we should have to give up all hopes of reaching camp that night, which I was still counting upon doing.

We did not delay on the East Peak, but kept on rapidly, and soon had crossed the col and reached "Blanca 4." It was now quarter-past six, and dusky. In less than an hour it would be dark; but in an hour we should have reached timber and the trail. Our spirits rose at the brightened prospect; and in a few moments we were busily engaged in finding a way over the crags and bowlders of the dangerous slope. As a rule it is as hard to go down a bad place as to go up; and for some reason I have generally found it much harder to select a proper path. Here it was more than ever perplexing. The crags looked far more formidable now than on the way up, and the growing darkness made it hard to recognize certain distinguishing features of our route noted in the morning. But we were nerved up to it, and considering the circumstances, did some pretty quick work. By the time we were half-way down the slope in point of distance, but practically through with the dangerous work, it was so dark that we could not tell the low scrub pines, which now began to appear here and there, from rocks, without going up close to them. We had made a " close shave."

I was beginning to fear that I could not, after all, follow the trail which would presently begin, when suddenly a bright gleam from across the valley, and presently another farther down, flashed through the darkness. Brennaman was building fires on the trail to guide us; he would probably wait for us there. So we thought. We sang out several times in unison, and pretty soon an answering shout came faintly back. We hastened on, and succeeded in striking the trail, which immediately descended into a depression, and the fires were lost to sight.

It was exceedingly difficult to trace our way. In following trails in the dark, one usually depends upon his sense of touch, — the feel of the trail upon his feet; but in this case the trail had been so long unused that this sense was practically useless.

Before long we came in sight of the upper fire, and made a bee-line for it. Nobody was there; and moreover, its light showed us not the faintest trace of a trail anywhere near it. We were disgusted, and said some bad words about the guide. Then we shouted some more, and thought we heard an answer from the direction of the lower fire. We started for it, and after stumbling around blindly in the thickening timber, came upon it suddenly in a rather thickly wooded glade. It was a fine fire, in a pretty spot; but there was nobody near it. The guide, then, had not waited for us. Penrose here detected a trace of the trail; but after several attempts I gave up trying to follow it. Had we been able to reach the aspens, where the trail had required much cutting and clearing, we could have reached camp almost with our eyes shut. But along here it had been rather hard to follow even in daylight, and now I found it quite impossible. As it was, a bivouac where we were seemed to be our only wise course. Penrose was exhausted, and was suffering from thirst; he was anxious to reach water. But he was finally persuaded that any further attempt to do this could only result in further failures, and since a night away from camp was therefore inevitable, it was better spent here, where there was a fire already blazing, and plenty of dry piñon, the best of fuels, than anywhere else, where we should have to kindle one ourselves. No sooner was this decided than my companion threw himself upon the ground by the fire, and was soon dozing. But a September night at our elevation, shelterless and without blankets, is very apt to be, at best, dangerously "cold comfort." To provide against this as far as possible, I built a low barrier of piñon saplings to keep off the wind, and collected several long logs of the dry wood as fuel for a large fire. These precautions proved necessary, but amply sufficient; indeed, the many virtues of this blessed tree never impressed me so strongly as they did that night. We were not more than a quarter of a mile from the upper tree-limit, and hence at an elevation of something like 11,000 feet. There was considerable wind, and the air was unbearably cold; in fact, there was frost in the valleys. Yet lying in the shelter of the living piñons, upon their deliciously soft, fragrant, and springy branches, and near the heat of the burning dead ones, we passed as comfortable a night as one could desire; though, to be sure, we occasionally awoke to the painful fact that the side toward the fire, through every available rent, — and there were many, — was being singed and cooked and "done up brown" generally.

We did not lack food; there was plenty left over from lunch. But the cold tin top of the canteen had to serve us instead of what should have been inside. I had the misfortune to wear a Mexican *sombrero* with a stiff brim about eight inches wide. When the wind blew hard, or when I wished to lie down, it was an abominable nuisance. I finally succeeded in keeping it quiet with a shoestring. Take my advice, and never wear a *sombrero* mountaineering.

Next morning, as soon as it was light, we started back to camp, which we reached in about two hours. Inside we were absolutely dry; outside we were glued up with piñon sap. So the first thing we did was to get wet inside and washed outside; then we could talk.

It seems that it was Dr. Bell who had answered our yells; he had spent the whole day amid the snows and lakes of the glorious amphitheatre I have several times mentioned. Becoming alarmed about us, he had built the fires as beacons; then he had heard our shouts, and reassured, had made his way back to camp, reaching there at about nine o'clock. He found the "guide" snugly ensconced at supper. He reported the amphitheatre indescribably grand and interesting. He had watched us during the entire ascent, and when we reached the summit he had joined in our jubilations; but we had neither seen nor heard him.

Before he had reached camp that night that Mexican "greaser" had for once bestirred himself, and had, quite unnecessarily, fired off into the air every rifle and pistol cartridge he could lay his hands on as signals to us; he had used up nearly sixty cartridges, some of them of considerable value. About a dozen Winchester cartridges, which I had stowed away with my rifle in one of the wagons, were all that escaped. We were wrathy when we discovered it, but Juan was as unmoved as ever.

It was a happy trio that drove back that morning over the dilapidated "road," and across the sage-bush and grease-wood plains to Garland. Dr. Bell generously pocketed his disappointment, and was as heartily jubilant over our success as were Penrose and myself. We reached Garland at noon, and there disbanded. Dr. Bell had to return to Colorado Springs that evening; but Penrose and I, at Mr. Kellogg's invitation, spent two glorious days hunting on the Culebra range. We did not have much luck; but Sierra Blanca, more superbly massive and majestic from the Culebra than from any other point, was always in sight as we tramped over the foot-hills, rifle in hand; and we had but to raise our eyes to the ragged cluster of snow-bedecked pinnacles to feel a thrill of self-congratulation, which amply consoled us for the strange lack of big game.

Sunday found us back in Manitou, with still one desire to fulfil. That was to stand once more upon the well known summit of old Pike's, simply to gaze, as we had often gazed as aspirants, but now as conquerors, upon the far-distant, serrated peaks of the Sierra Blanca.

Bibliography.

ZEITSCHRIFT DES DEUTSCHEN UND OESTERREICHISCHEN ALPENVEREINS. Vienna, 1890. Band XXI.

THE annual volume of this active European society is in itself a mountain. It represents a vast amount of wandering and study; and the reports of these are indicative of the wonderful powers of research and patient investigation to which Germans are trained. It makes a large volume of five hundred pages, bristling with figures of the measurements of height, depth, and length of mountains, lakes, and streams. Eighty-one illustrations, some of them very beautiful, illuminate the text; and seven carefully prepared maps, one of them a marvellous piece of work, are folded separately and slipped under a band at the end of the book. In addition to these, there are two sheets of illustrations, after celebrated artists, depicting various Alpine scenes. Ten pages are devoted to the Alpine literature of the year, including papers and books on meteorology, glaciers, and the high-lying Alpine lakes.

The main part of the volume is filled with fifteen chapters, — by as many writers, — all but two of which are closely scientific. These two are separated from the others, in the table of contents, by dashes above and below, as if to isolate them from their surroundings and to point out their difference in character. But to the laical mind they are quite technical enough, while at the same time extremely interesting. One is upon Alpine landscape painting, by August Schaeffer, with short sketches of famous artists who have made the mountains their studios; and the other is the legend of "Kaiser Max auf der Martinswand." It tells first the simple tale of Kaiser Max losing himself among the crags of that wild spot, when hunting the chamois, and being saved by a hunter, in gratitude for which he raised a stone cross, which has stood these hundreds of years; and then narrates the legends that have sprung from this fact.

The mountain regions described so minutely in some of the chapters are not known to many Americans; and indeed the writers speak of several as being almost unvisited by Europeans in their travels. But perhaps here and there among our own climbers who love to seek out-of-the-way places the following names may recall pleasant remembrances, or they may find here suggestions of places to visit when next they are the other side of the sea: "Enneberg und Buchenstein," "Mieminger," "Die Niederen Tauern," "Die Sappada-Gruppe," "Die Karnischen Alpen," "Das Uskoken-Gebirge," "Berner Oberland," and "Jotunheim." A little world of information about all of these places is comprised in this Annual.

From the remaining articles we select two for special notice, as of the widest popular interest, — "Die Grottenwelt von St. Canzian" and "Vulkane und Gletscher im Nordamerikanischen Westen." Friedrich Müller tells the wonderful story of the explorations of that region, where the Reka River sinks into the ground; where it becomes a raging, swirling river, with sixteen waterfalls, emerging again as the Timavus, that flows calmly into the sea. In a profusely illustrated article of fifty pages an abstract is given of all that has been discovered of these caves and grottos, from the time of Strabo to this year of our Lord; and an intensely interesting history it is. Many prints are given of the remains that have been found, but nothing more pathetic than an empty helmet found wedged in the rocks, which the wise men say must have been worn by some warrior five hundred years before Christ. Drowned in the Reka, his body was borne through this subterranean channel and tossed about on the mad waves, while all through the long centuries the helmet has stayed where it was flung by the waves.

The paper on the glaciers and volcanoes of our own Northwest, by Karl A. v. Zittel, is one of the simplest in style, as well as one of the most enthusiastic and generous in spirit, of any chapter in the book. The point of special interest is the visit to Tacoma, and the writer's ascent to the edge of its crater. It is a great jump to read of places which have been known and described from the time of Strabo, to the description of Tacoma, which was first described with pen and pencil in 1833; but Tacoma could afford to wait in all his majesty. Herr Zittel fully agrees with a German botanist, who two years ago said that never in Switzerland nor in the Tyrol had he seen a mountain that could compare with it in imposing dignity and beauty. Professor Bryce was in the goodly company of seven who made this partial ascent with Herr Zittel; but they did not accomplish as much as many parties have since done, including one that last August spent a night upon the summit, with a young lady among the climbers, — the first woman to stand upon that glorious height. Views of Mt. Hood, of Tacoma, and of the glaciers of the latter mountain are presented. The view of Tacoma is from a pencil-sketch, and while comprehensive, does not give nearly as good an idea of the apex of the mountain as do the numerous photographs that have been taken since Herr Zittel was there. I. C. B.

Annuaire du Club Alpin Français. Seizième Année, 1889. Paris, 1890.

This volume, with its always attractive pages, comes to us rather larger than usual. The annual report of the Central Committee of the Club shows a membership of 5,356, as against 5,431 of last year. In commenting on the cause of this decline, which doubtless is only accidental and temporary, the author says, what has often occurred to the minds of members of similar clubs: "Many people think that, to enter an association, they must have made difficult or dangerous ascents. You know how baseless is this idea. Our ranks are open to all those, both men and women, who love the mountains even at a distance."

About one third of the volume is devoted to mountaineering literature, one third to less ambitious travelling in France and its provinces, and the rest to foreign geography, with but little relation to high altitudes.

The first place is given to the ceremonies at Dijon, on the placing of a memorial tablet upon the birthplace of M. Adolphe Joanne. The address of M. Charles Durier, Vice-President of the Club, recounts the services of the distinguished geographer to the Club as its founder; to France, as the writer of so complete guide-books to its every nook and corner; and to the world at large for his many additions to geographical literature.

"La Tsanteleine," by M. H. Ferrand, is a study of the group which gives name to the paper, and its neighboring ridges around the head-waters of the Isère and on the boundary of France and Italy near the Mt. Cenis Pass. Two of the climbs were first ascents. The ascent of Rochemelon was marked by the narrow escape of the writer from arrest as a spy by the Italian gendarmes. His ascent was made from Susa, and the officers did not succeed in overtaking him until he had reached a height of nearly 10,000 feet, within 700 feet of the summit. His certificate of membership in the Italian Alpine Club was all that convinced his captors of his innocence. He calls this adventure "probably the highest arrest ever tried in Europe." An ascent of Mont Tondu, 9,600 feet, the southwestern buttress of Mont Blanc, is made by M. Pierre Puiseux from the valley of Montjoie. In "Rochers et Aiguille de l'Argentière du Massif de Belledonne," M. V. Cadiat describes his ascent of this hitherto unconquered peak among the Alps of Dauphiné.

"La Frontière Franco-Suisse entre les Cols de Balme et du Tour," by M. P. Beaumont, is accompanied by an excellent map of the district, on a scale of 1 : 30,000. "Les Mouvements des Glaciers de Chamonix," by M.Ch. Durier, is written mainly to introduce a phototype of the Glacier of Taconnaz; it is one of a series of short papers appearing for several years past. with accompanying illustration, to note the change in form and extent of the principal glaciers of the valley of Chamonix, — Argentière, Des Bois, and Des Bossons. M. Charles Massin describes, in "Le Col du Grand Cornier ou de la Dent-Blanche," an excursion made by him on this little-used pass from the Val d'Hérens to the valley of Zermatt. "Les Montagnes du Tirol," by M. Edgar Vatin, gives a lively account of his ascent of the Ortler from Trafoi, with the advantage of fine weather and clear views. The only other article which treats of the Alps is an extract from an account of a journey from Grenoble to Mont Cenis, made in 1787, annotated by M. J. Martin-Franklin. The author spent six days on the route, going first to Chambéry, and remained three days at the Hospice on the pass of Mont Cenis.

The Pyrenees are represented by two articles, — one by M. J. Fontès, describing his ascent from the northeast of "Le Pic de Cambieil," 10,320 feet; and the other by M. le Comte de Bouillé, "Le Pic du Ger," treating of the geology, fauna, and flora of that mountain.

"Dix Jours en Provence," a semi-anonymous paper, treats mainly of a short excursion from Arc-sur-Argens to St. Tropez, on the shore of the Mediterranean, across the low, granite, wooded ridge of Les Montagnes des Maures.

The beauties of the picturesque Belgian highlands are described by M. Paul Collinet in "L'Ardenne."

"En Barque sur l'Ardêche," by M. P. Bauron, tells us of a day's voyage in canoe on the lower course of this stream, passing between high wooded cliffs and at one point under a natural arch, which spans the stream at a height of seventy-four feet.

M. E. A. Martel, a member as well of the Appalachian Mountain Club as of the French Alpine Club, who has become well known to all readers of Alpine literature as the *exploitant* of the underground and overground wonders of the western Cévennes, presents a second paper on "Sous Terre." In this he gives the results of a second summer's exploration of the grottos and pits of the Causses He was accompanied, as before, by his cousin M Gaupillat, the reproduction of whose photographs adds much to the elucidation of the subject. They have thus far examined fourteen of the pits, varying in depth from ninety-three to 690 feet. A canoe-voyage in the picturesque valley of the Hérault closes the article.

The example of M. Martel stimulates Madame Gabrielle Vallot, a member of the Club, to explore sundry limestone caves in the neighborhood of Lodève, in the southern Cévennes. Her paper, illustrated by many plans and illustrations of the most beautiful of the stalactite formations, is entitled "Grottes et Abîmes."

"Six Jours au Pays des Ksours," by M. Victor Riston, takes the reader to that part of the French colonies lying on the watershed between the Gulf of Guinea and the Mediterranean in southwest Algeria, the term "ksours" being the local name for fortified towns. M. Amédée Matton presents a paper with the title "En Corse," in which he relates his rambles back and forth across the island in the summer of 1888, and shows how much can be seen there in a week.

The principal interest of M. L. de Launay's article, "De Lisbonne à Ronda," lies in his full description of the copper-mines of the Rio Tinto in southwest Spain. Of Huelva, the port of shipment of the ore, he says: "It is impossible, I think, for one entering the town, finding himself addressed in English, seeing on the tables of the reading-room all the latest English and American papers, not to believe himself transported to one of those astonishing cities of new countries, — of California, of Australia, or of Panama; to one of those new cities of a day's growth, each like every other, with the same board shanties, their theatre, their police-stations, their bars, their churches, and their hotel-caravanserai, in the office of which are constantly displayed telegrams from all parts of the world." A description like this must apply to some new suburb, not to the old city.

M. Georges Louvier half apologizes for presenting to his Alpine readers "De Tamatave à Tananarive," as his tour from the coast to the inland capital of Madagascar was made in palanquin, the only mode of travel practicable there for Europeans.

"Autour de la Mer des Antilles" is a general description of the continental and island coast of the Caribbean Sea," the "American Mediterranean," by M. A. Salles, who as an officer on a French government cutter spent two years in those waters. A short article, explaining by a diagram an optical phenomenon arising from the refraction of light by a thick fog, closes the literary portion of the volume.

Seven maps and plans and forty illustrations add beauty to the number and clearness to its descriptive text. F. W. F.

BOLLETINO DEL CLUB ALPINO ITALIANO PER L'ANNO 1889. Torino, 1890.

THIS Bulletin, the fifty-sixth in order of publication, is an evidence of the activity of the Italian Alpine Club in its various departments. It contains many articles more or less connected with mountains and mountain climbing. The initial one, entitled "To Monte Rosa from Macugnaga," is a description of the first crossing of the Zumstein Col, by Professor A. Ratli. A paper entitled "The Bone Caves of Bandito, Val Gesso" (in the Maritime Alps), in which were discovered remains of a pre-Quarternary age, is contributed by Dottore Federico Sacco, while Signor Giovanni Bobba discusses the valley of Rhêmes, which to judge by its accompanying illustrations may well be deemed worthy of exploration and description. Leonardo da Vinci and his love for the mountains finds able consideration at the hands of Signor G. Uzielli, who treats the topic from the sentimental and the poetic points of view, but presents as well its scientific aspect. Of great value in connection with this paper are the reproductions of many rare old maps of the districts known to Da Vinci. Another paper, the author of which is Signor Guido Rey, has for its principal theme "The Needles of Arves."

The principal article, and one which is of especial interest at the present time, is that of Signor Vittorio Sella, entitled "In Central Caucasus." Interest attaches to this region through recent determinations of heights, and a late discussion of boundaries which may throw Elbruz and others of the higher peaks which overtop Mont Blanc into Europe; further, from the fact that English alpinists have now turned their faces in that direction.

Signor Sella's paper is not pretentious; it is the simple story of his journeyings, through wild countries, up steep and snowy slopes, with interesting discussions of the people and the scenery. The literature pertaining to this region is very scant, and his paper has a flavor of novelty, aside from its value as the story of a keen observer. With his camera, the use of which in mountain work has, he says, awakened in him a new appreciation of the beauties of Nature, he has climbed to heights the peer at least of Mont Blanc, and has brought away with him marvellous panoramas, which shed new light upon the grandeur of this remarkable district. Those who have viewed the photographs, of which a few have been exhibited at the rooms of the Club, need no argument to prove to them the value and the dignity of Signor Sella's work.

A fine reproduction of Ushba from Betsho forms a fitting frontispiece to the Bulletin, while numerous illustrations of a less serious nature, taken also from his photographs, are introduced into the article itself. The outline of the magnificent panorama from the east cone of Elbruz at an altitude of 5,000 metres is of itself a valuable addition to our knowledge of mountains. J. R., JR.

GUIDA AL GRAN SASSO D' ITALIA. ENRICO ABBATE. Pubblicata per cura della Sezione di Roma del Club Alpino Italiano. Roma. (222 pages, 29 illustrations, 4 maps and plans.)

THE Gran Sasso d' Italia, containing the highest peak in Italy south of the Alps, Monte Corno, 9,500 feet, is a group of the Apennines about twenty miles long. Monte Corno stands about sixty miles north-northeast of Rome, and twenty miles from the shore of the Adriatic. The Gran Sasso is composed mainly of limestone, and is nearly bare of forests. In its climate, and especially in the amount of snow found in its ravines in the summer, it closely resembles the Presidential group of the White Mountains.

The ascent, though arduous, partakes of none of the difficulties characteristic of the higher Alps. A club-hut, constructed in 1886 by the Roman section of the Italian

Alpine Club, at the height of 7,150 feet, greatly facilitates the exploration of the various peaks.

The approach to the Gran Sasso from Rome is made by rail as far as Aquila, from which place a carriage road leads in ten miles to Assergi, the last village on the way, situated at an elevation of 2,750 feet. Beyond this the ascent is continued either on foot or on mule-back. It requires about four and a half hours to climb by a very steep path from Assergi to the Passo della Portella, 7,332 feet, from which there opens a grand view through a wide valley on the eastern side of the ridge. From this col to the club-hut the path runs nearly level for an hour around the southern edge of a plateau, and descends in the mean time about 150 feet. Beyond the hut it becomes quite steep again, and brings one in three hours to the western or higher summit. The view embraces the whole width of Italy, and in clear weather the mountains of Dalmatia across the Adriatic. The city of Rome is hidden by the Sabine Hills.

The guide-book describes not only the mountains, but all the principal towns on either side. The smallness of the region described, the excellent literary taste of the author, and his perfect familiarity with his subject have enabled him to produce a guide-book which is a veritable model of completeness and clearness. The two maps of the mountains — one on a scale of 1: 150,000, and the other on a scale of 1 : 25,000 — are so clear and full that one familiar with mountain work could easily find his way over the paths without the aid of any other guide.

The typography and the illustrations are of such superior excellence as to merit special approbation. F. W. F.

ILLUSTRIRTER FÜHRER DURCH DIE DOLOMITEN. JULIUS MEURER. Mit 47 Abbildungen und 11 Karten. A. Hartlebens Verlag, in Wien, Pest, und Leipzig, 1890.

No lover of the mountains who has seen Miss Edwards's "Untrodden Peaks and Unfrequented Valleys" can ever cease to desire a more intimate acquaintance with the marvellous scenery so graphically depicted by her pen and pencil. Lying near the southeastern limit of the Alps, the Dolomites present features of towering masses, bold cliffs, sharp pinnacles, and brilliant coloring seen nowhere else together in Europe. Judging by the literature of our own country, but few Americans go far enough out of the beaten paths of travel to visit this land of wonders. Even the Alpine tourists of Europe have hitherto lacked a special guide-book to this region, until now Herr Meurer, whose name is well known to them, and whose fifteen years of tramping and climbing among the Dolomites has given him special fitness for this work, has issued this admirable volume.

The illustrations, as souvenirs of the scenery, are more uniformly good than those in some of the thirty-eight illustrated guides issued by the Hartleben press; and the maps are a most valuable help to the discriminating tourist. F. W. F.

CLIMBERS' GUIDE TO THE CENTRAL PENNINE ALPS. WILLIAM MARTIN CONWAY. T. Fisher Unwin: London, 1890.

A LITTLE, thin 16mo book in coarse brown linen covers, with pocket-book fold, without maps, and containing not a word about hotels, railroads, coaches, or even horses, it is about as useful a book to the majority of travellers as an illustrated catalogue of an art gallery would be to a blind man. Yet to one whose enthusiasm for the mountains would lead him to scale the peaks and traverse the glaciers of the Alpine region between the Great St. Bernard Pass and the Zermatt Valley, and whose legs and heart and lungs are equal in strength to his enthusiasm, this tiny volume is invaluable.

It describes with the least possible waste of ink the various routes to all the considerable peaks and cols in the district named, tells when and by whom the several ascents were first made, and indicates, wherever possible, the Alpine publication in which may be found an account of the ascent. Heights are given in metres and in feet, and distances are indicated, not by miles, but by hours, which is by far the more intelligible method in dealing with steep or long-continued ascents or descents. The place of maps is supplied by notices of the best extant, with information as to where they may be obtained.

F. W. F.

MONTE ROSA E GRESSONEY. VITTORIO SELLA e DOMENICO VALLINO. Biella, 1890.

IT is rarely that one meets with so beautiful a reflection of what is grand and lovely in Nature, and interesting in the people whose life is passed under its influence, as in this memorial album. The valley of the Lys, on the Italian side of the main chain of the Alps, hitherto remote and little frequented, is about yielding to the encroachments of civilization; the railway is coming near; the tide of tourist travel, with its levelling influence, is announced. Two lovers of the primitive beauties of the secluded vale have hastened with camera and pen to catch the flitting expression of the life that nestles here, and have shown it forth exquisitely, coupled with pictures of the noble scenery that, happily, man can never succeed in making different from what it is to-day.

That Vittorio Sella made the photographs, is warrant enough of their excellence. We have known him hitherto only as a prince of photographers of mountain scenery. Here he appears with an added title to the name of artist, in the best meaning of the term. The sense of grace in attitude, of the poetic in composition, of what is most human in humble daily life, is evinced by several of the pictures which present so vividly this bit of Germany in Italy. Thus, in the scene in a street of Lillianes on the way to Gressoney, on the wall of a building one reads a placard, "Publications de Mariages." Besides the young man and maiden, whose horse is attached near the door, yet who seem uncertain whether or not to enter in, there stands in the doorway a merry-faced grandam, gossiping with a cheery old man, her contemporary. The pathetic churchyard scenes, the mountaineer at the shrine before setting out for the dangerous climb, the children of toil, the merry festa, indicate the variety of life represented. Perhaps the most pleasing of all this series is the simple picture, in light terra-cotta tint, of a young woman at the washing-trough under a projecting awning of wood, who looks archly up with dimple and smile to her companion in the doorway between the spectator and herself. It is hard to realize that it is from life, and not the work of some artist of the Düsseldorf school.

What can be said of the superb views of Monte Rosa, the Lyskamm, and Castor, the gathering cyclone of July, 1889, as seen from the lofty Capanna Sella, its effectiveness heightened by the blue tint employed; the peaks of the Weisshorn and the Mischabelhörner seen in early morning from the snowy Castor, rising like rocky islets above an otherwise unbroken sea of fog; of the magnificent view down upon the Lys Glacier, with its myriad séracs and crevasses? Nothing, except that at the happiest moment Sella and his camera were there, and that they are reproduced for us in a manner that we have never seen excelled. This is particularly true of the phototypes, some thirty in number. Besides these, there are numerous excellent "half-tones," not surpassing, however, the work of our American makers.

Signor Vallino's text seems worthily to perform its less striking part, — to explain the pictures so far as is required, to tell the story of the Lys valley, and to chronicle for the alpinist all that his colleagues have done in the way of exploration and adventure among these peculiarly attractive peaks of the Central Alps. An interesting chapter is devoted to hunting and the chief hunters of the region; and another yet more valuable treats of the German dialects spoken in the valley, illustrating it by citations from Zumstein, its leading poet. Parallel metrical translations into High German and into Italian prose accompany them.

C. E. F.

THE WHITE MOUNTAINS. By JULIUS H. WARD, New York. D. Appleton & Co., 1890.

Mr. Ward, a member of the Appalachian Mountain Club, says of his book that "it is not a guide-book nor an itinerary, and yet at times it ventures into the region of both." Wherever it does so it is sure to be useful to one visiting the mountain places of New Hampshire. The contents alone indicate that. They are divided into groups, the first including a general survey of the region to be visited, with directions for reaching the various points; other groups are "The Presidential Range," "Within the Mountains," and "The Franconia Range." The appendix contains a succinct chapter on "Walks through the Mountains," written by another Appalachian, a complete list of all the papers on the White Hills that have appeared in APPALACHIA, together with books on the same subject, a table of altitudes, and a good index. Numerous photogravures and a map add to the interest and value of the volume, though the former are rather suggestive than descriptive, since mountain pictures are usually disappointing on so small a scale. Choice quotations from famous poets harmonize well with the special purpose of the book. The sub-title explains that purpose: "a guide to their interpretation." It is "an attempt to express the enrichment of human life that comes from the knowledge of the harmony that exists between the mountains and ourselves, when they are approached through the sympathetic imagination." In the visible effort to reveal the hidden things of the mountains Mr. Ward is less happy than in his charming descriptions of the natural beauties of the woods, the tarns, and the rugged peaks. The clergyman is ever present, as well as the mountaineer. The mountains all speak to him in a language that he can understand; but when interpreted that language does not always correspond to what others read in these mighty tomes of Nature. The mountains speak "a various language," and few are the poets or seers who can interpret for others that silent speech. Mr. Ward seems to be as much at home all through the mountainous parts of New England as common folk are in their own gardens, and his love for the hills is genuine and inspiring. He has learned their secrets in lonely climbing. While we should agree with Mr. Ward that Starr King's "White Hills" is not yet nor "likely to be superseded," yet we heartily welcome this contribution to the literature of that beautiful region. I. C. B.

Proceedings of the Club.

May 9, 1890 (Evening). — One Hundred and Eleventh Corporate Meeting.

President Mann in the chair.

One hundred and thirty persons were present. Seven candidates for membership were elected.

Rev. W. F. Dusseault delivered a lecture entitled "The White Mountains of New Hampshire." A fine collection of stereopticon views, prepared by members of the Boston Camera Club, was exhibited. The scenery of Lake Winnepesaukee, the Pemigewasset and Mad River Valleys, Franconia Notch, Dixville Notch, Mount Washington, Crawford Notch, Jackson, North Conway, Chocorua, and other points was beautifully illustrated and described.

June 11, 1890. — One Hundred and Twelfth Corporate Meeting.

President Mann in the chair.

Fifty persons were present. Twenty-five candidates for membership were elected.

The President gave an account of the meeting, held May 24, to consider the subject of the Preservation of the Natural Scenery and Historic Sites in Massachusetts. The meeting resulted in the appointment of a committee to bring the subject before the Legislature next winter.

A paper prepared by Mr. F. H. Chapin, "The San Juan Mountains, Southwestern Colorado," was read by Professor C. E. Fay. (See p. 147.)

Mr. F. O. Carpenter presented a paper entitled "The Appalachian System in North Carolina." After a general description of the whole system, he described the principal ranges in that State, the Blue Ridge and Smoky Mountains, and the transverse ranges, the Black, Newfound, Balsam, Cowee, and Nautehaleh Mountains.

Remarks were made by Messrs. R. B. Lawrence and J. R. Edmands.

Mr. Emil Huber of Zürich, a member of the Swiss Alpine Club, exhibited some fine Alpine photographs, his own work.

July 1–8, 1890. — Twenty-fifth Field Meeting.

The Twenty-fifth Field Meeting was held at the Deer Park Hotel, North Woodstock, N. H. One hundred persons were present.

In the absence of the President, Vice-President, and Recording Secretary, the Corresponding Secretary called the meeting to order in the parlor of the hotel at 8 P. M. July 1. Mr. Rest F. Curtis was chosen Chairman of the meeting, and Mr. F. W. Freeborn, Secretary.

The Corresponding Secretary gave notice of the annual meetings of foreign Alpine Clubs.

A paper on "The Ascent of Nantai San," a volcano in Japan, by Rev. W. J. Holland, was read by Mr. F. W. Freeborn. (See p. 109.)

Notices of the excursions to be made were read by Mr. W. R. Davis, chairman of the Committee for the Field Meeting.

A description of the topography of the country about North Woodstock was given by Mr. F. O. Carpenter.

Mr. W. H. Ladd spoke in favor of extending the trip over the Lafayette range to two days, camping on the ridge.

Mr. E. C. Eastman spoke of the interest of the Club in the preservation of the forests, and introduced as the next speaker Mr. Joseph B. Walker, of Concord, Chairman of the Forestry Commission of New Hampshire.

The latter said that he had been a member of a similar commission a few years ago. Their report had been pigeon-holed; but the Legislature of 1890 had created a new commission to consider and report on the feasibility of taking all or part of the forests about the principal places of resort and about the mountains, and of keeping them as public parks. He spoke at length of the facilities afforded by the State for health and recreation, and of the great pecuniary advantage derived by its inhabitants from these resources,and showed how much it concerns the Legislature to take such measures as should preserve this advantage. The defacement of scenery by advertisements could easily be checked. The danger of permanent injury by the indiscriminate cutting down of the forests was not irreparable; the greatest danger was from fires, which destroyed not only the trees but the soil. The greatest need was to create a public sentiment against forest fires, such as would lead to greater care to prevent their starting, and greater promptness in putting them out. He appealed to the Club to aid as far as possible in this work.

October 15, 1890. — One Hundred and Thirteenth Corporate Meeting.

President Mann in the chair.

In the absence of the Recording Secretary, Mr. F. W. Freeborn was chosen Recording Secretary *pro tempore*.

One hundred persons were present. Twenty candidates for membership were elected.

The President, on the part of the Room Committee, read a request for volunteer custodians at the Club Room for certain afternoons.

Mr. Abbott Lawrence Lowell described "An Ascent of Monte Rosa," made the past summer by himself in company with two guides. He dwelt at some length on the importance of close attention by the tourist to his outfit, particularly the protection of the eyes against the glare from the snow. His ascent was from the Riffelberg. Starting from there at midnight, he ascended to the Gorner Grat, crossed the Gorner Glacier and the Great Glacier, and reached the Obere Blattje about 3.30. Three hours more brought him to the top of the ridge, where he breakfasted; here one of his guides was disabled by mountain sickness. At 8.30 he had reached the summit, but the view was hidden by the gathering clouds. The descent was made without accident, and he reached Zermatt at 2 P. M. To illustrate his remarks, he drew upon the blackboard a graphic panorama of the Zermatt range from Monte Rosa to the Weisshorn.

Miss M. E. Hardwick read a carefully prepared paper on "Glimpses of Alaska," giving an account of a three weeks' voyage on the "Elder" from Tacoma to Sitka and return, stopping at many points of interest, and notably at the Muir Glacier.

November 12, 1890. — One Hundred and Fourteenth Corporate Meeting.

President Mann in the chair.

Seventy-five persons were present. Fourteen candidates for membership were elected.

It was voted to hold the annual reception as in previous years, and to request the President to appoint the following committees: a committee on the annual reception; a committee to audit the Treasurer's accounts; and a committee to nominate officers for the year 1891.

The report of the Councillor of Topography alluded to the publication of the Map of the Country about Boston, and to the efforts being made for the preservation of the beautiful and historical places of Massachusetts.

The Councillor of Art reported that three photographic exhibitions had been held, and that a fourth, showing the work of Club members during the past summer, would be held November 17, 18, 19, at Park Street, from 2 to 5 P. M. The department has added many photographs during the year to the Club's collection.

The Councillor of Improvements described the additional work done at the Madison Spring Hut, to render it more comfortable. He also suggested that a line of cairns be erected from Washington to the hut, to prevent such loss of life as happened the past season.

Professor William H. Niles addressed the Club upon "The Influence of Mountains upon Human Life." Referring to the influence of mountains upon the geographical distribution of mankind, the speaker divided the mountain into sections: above the snow line there are no habitations; the alpine region, between the timber and snow lines, is used only for pasturage, a temporary occupation; below timber line the slopes are so steep and broken that population is sparse; at the head of a valley we find a little hamlet, at the junction of two valleys a larger one, while towns belonging essentially to the mountains are found where the base meets the plain. — The influence of mountains upon the boundaries of countries is inversely proportional to the civilization of the people. Civilization overcomes difficulties; and as the enlightened man does not stop when he reaches a mountain, he bounds his state by the surveyor's line. Yet such boundaries have become perpetuated, the Pyrenees and the Taconic range of western Massachusetts being among the many illustrations cited. — In military contests, mountains have become fortresses for the protection of the oppressed, the history of Switzerland offering many examples. — The Asiatic peoples are more distinct in race than the European, on account of the topography of their countries. The influence of mountains on man's occupations was dwelt upon, the speaker showing how agriculture, manufactures, arts, and mining are affected. Of late years, natural scenery also has given to the Swiss a national occupation. — While mountains have by their stimulation a beneficial influence upon the physical constitution of the city man, who spends only a portion of his time among them, they have by their severity a tendency to retard the development of the man who lives constantly among them. The influence of mountains on the social and intellectual qualities is seen in many ways. The people of the plains are nomadic; those of the mountains are domestic. Mountaineers make and own their homes, and this is a foundation for their patriotism. The influence upon man's religion is seen in the superstitions of the savage, the veneration of the Greeks, and above all in those great events which took place upon the summits of the mountains of the Holy Land. In more modern times the mountains have had a great influence upon literature and art, and to-day the science of mountains in its many departments is being rapidly developed. Finally, man is in no way so called upon to elevate himself as by the mountains, the noblest temples of God.

Members added since March, 1890.

Armstrong, George W., Brookline.

Barton, Miss Alice M., Roslindale.
Beam, William H., New York.
Browne, William H., Boston.

Carpenter, Mrs. F. O., Roxbury.
Carrie, William A., Boston.
Chase, Walter G., Brookline.
Chester, Miss Florence H., Brookline.
Church, William Lee, Newton Centre.
Clapp, Mrs. George B., Boston.
Crocker, Uriel H., Boston.
Colby, Miss Kate L., South Boston.

Davis, Carleton E., Boston.
Douglas, J. Walter, Philadelphia, Pa.

Felt, Miss H. Alberta, Sharon.
Felt, Miss May L., Sharon.

Flister, Herman, Jr., Boston.
Fuller, Miss Mary A. H., Dorchester.

Griswold, William M., Cambridge.

Hall, Miss Charlotte B., Boston.
Harrington, George H., Boston.
Harwood, P. M., Boston.
Holland, W. J., Pittsburg, Pa.
Holway, Mrs. Mary M., Chelsea.
Homans, Miss Amy Morris, Boston
Hooker, Mrs. Theodora Ames, Davenport, Iowa.
Hosmer, George Herbert, Dorchester.
Humphreys, Miss M. A., Dedham.
Hutchins, Miss Amy, North Cambridge.

Jenks, Mrs. Henry F., Canton.
Johnson, Miss Almira S., Boston.
Johnson, C. S., Boston.
Jordan, Miss Clara M., Brookline.

Kaan, Miss Frances W., Somerville.
Kelsey, S. T., Linville, N. C.

Lawrence, Samuel C., Medford.

Morse, Edward G., Roxbury.
Morton, James M., Jr., Cambridge.

Newell, Mrs. Emma F., Chelsea.
Nutter, Miss Angie P., West Roxbury.

Oliver, Israel B., Lynn.
Oliver, William T., Lynn.

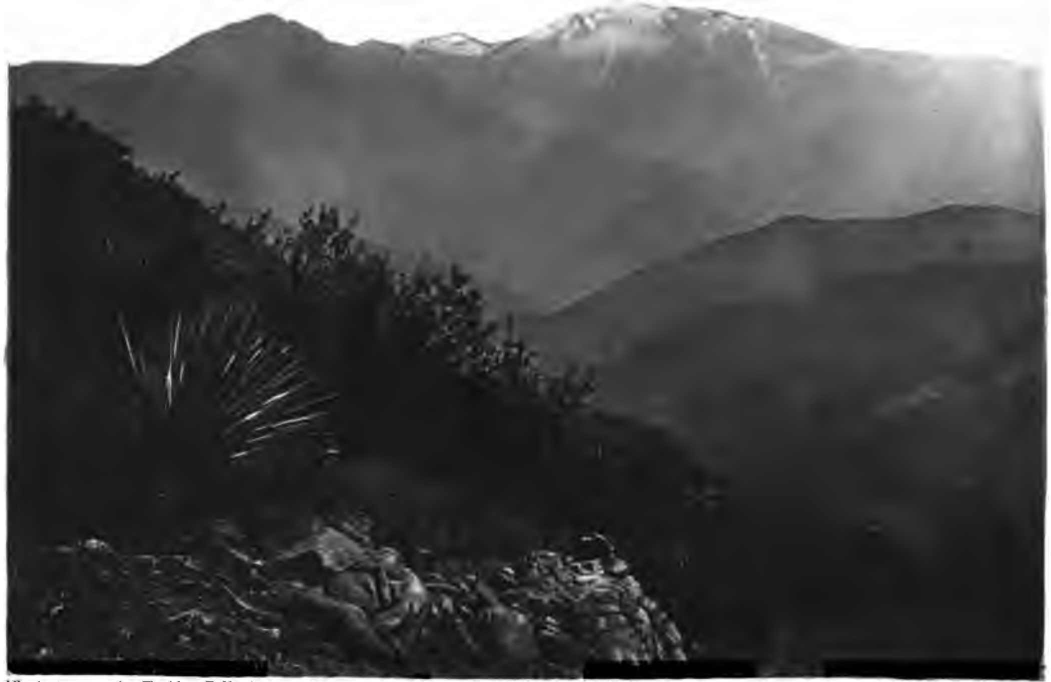
Palmer, Julius A., Jr., Boston.
Parkhurst, Miss Edith A., Somerville.
Pettengill, John W., Malden.
Pierce, George R., Nashua, N. H.
Pigeon, James C. D., Roxbury.
Porter, Mrs. P. G., Cambridgeport.

Safford, Arthur T., Boston.
Smith, Miss Etta M., Boston.
Smith, J. R., Springfield.
Smith, Mrs. J. R., Springfield.
Smith, Miss M. E., New York.
Spalding, Miss Ellen R., Salem.
Stearns, Mrs. C. C., Hartford, Conn.
Stevens, Lindley M., Boston.
Swift, Walter B., Wellesley Hills.

Thayer, Mrs. Clara C. P., Chelsea.
Thompson, Mrs. Edward, Boston
Thurston, Miss Charlotte W., West Newton.
Tufts, Miss Mary I., Lynn.
Turner, Miss Theodora W., Boston.

Van Daell, Alphonse N., Roxbury.

Warren, H. Winslow, Jamaica Plain.
Weld, Miss Lina S., Dedham.
White, Franklin W., Boston.



Photogravure by Charles Pollock

Photograph by J. H. White

SAN ANTONIO MOUNTAIN ("OLD BALDY.")

Sierra Madre Range, So. California.

APPALACHIA.

Vol. VI. BOSTON, JULY, 1891. No. 3.

A Classification of Mountain Ranges according to their Structure, Origin, and Age.

By Warren Upham.

Read April 8, 1891

The sea, in its vastness, reaching far beyond the encircling flat horizon, is a better symbol of infinitude and of eternity, than is the most majestic mountain range, lifting its serrated forehead miles above the ocean level and seeming almost to pierce the sky. The sea itself, but no part of the land forming its shores, has continued unchanged through the series of geologic eras.

> "Time writes no wrinkle on thine azure brow—
> Such as creation's dawn beheld, thou rollest now."

But on the land, no sooner have the subterranean forces upheaved a mountain, a plateau, a continent, or an island, than the processes of subaërial erosion begin to contend against it. Rains, frost and heat, chemical change, subdue the most enduring and solid rock formations, dividing them with fractures, and pulverizing their masses and fragments to sand and clay, which gravitation by the vehicle of running water carries down and away to the sea, there to find rest until another uplift shall renew the cycle of changes. "The mountain falling cometh to naught; and the rock is removed out of his place."

The form of mountains and of their ranges and systems is due to the combination, in varying ratios, of constructive and destructive agencies. The first only seem necessary; but the second have generally been far more efficient to give the shape and outlines of all our mountains, excepting volcanoes. Constructive forces have done work that may be compared to the quarrying of the block of marble and bringing it to the artist's studio; destructive forces, producing the present mountain forms, as they stand before our vision, have done work like chipping away the greater part of the marble block and chiselling it to the finished statue. It will be convenient to speak of the constructive processes as mountain-building, and of the destructive as mountain-sculpture.

It is from observation and study of the geologic structure of mountain ranges, the diverse rock formations of which they are composed, and their attitude and relationship to each other, that we discover and understand their origin, how, by what agencies, the mountains have been built and sculptured. Structure and origin are thus very intimately connected, and demand the same division under classes and types. In this classification, when citing examples of each type, we can commonly note also their geologic age, or the epochs of deposition of the rocks forming the mountain range, the epoch of their upheaval or successive upheavals, and the subsequent time during which they have been exposed to erosion.

Six classes of mountain ranges may be discriminated, which, from predominant features of their structure, may be named as (1) folded, (2) arched, (3) domed, (4) tilted, (5) erupted, and (6) eroded. In each class, the present contour of peaks, ridges, buttresses, and slopes, has commonly been produced by the destroying frost, storms, and streams; but wherever some special phase of mountain-building is discoverable within the disguise which the superficial transformation has imposed, the mountain range or separate mountain is thereby referred to its constructive type. The last-named class therefore is intended to include only those mountains and ranges which owe their prominence to the denudation of an equal or greater thickness of the same rock formations from the surrounding country or from the valleys that divide them from other mountains, while the structure of the masses spared by this erosion does not place them in either of the five preceding classes as areas that have experienced mountain-building or orogenic movements. The sixth class belongs to areas where continent-building or epirogenic movements of widely extended elevation have been followed by so deep erosion that mountains have been made wholly by sculpture. Often the processes of mountain-building have combined in the same range the features which give names to two or more of these classes, but usually there is some chief element in such complex structure, predominantly allying the range with one of the five orogenic types. Faults, as the geologist calls dislocations of the rock formations, where the portion of the earth's crust on one side of a plane of shearing has been borne upward or forward, while the portion on the other side has fallen downward or backward, often complicate each of the six classes of mountain structure; and they are the sole or principal means of formation of the fourth, that is, of tilted ranges.

The plan of this essay is to examine the structure of each class, and to inquire what was the manner of action of the mountain-building or orogenic forces producing each of the five constructive types, and of the continent-building or epirogenic forces producing the broad elevated expanses from which erosion has formed the sixth type, mountain remnants of destroyed high lands. Examples of each class are described, and the geologic age of their rock formations, of their upheaval, and of the ensuing erosion, is stated so far as it has been studied out, giving thus, in a brief way, both a description and a history of the mountain range or system.

1. *Folded mountain ranges.* — Foremost in their geographic importance, and in the intricacy and significance of their geologic structure and origin, are the mountain belts which consist of folded rock formations. The strata forming the upper part of the earth's crust are bent up and down in long, nearly straight or curving, wave-like ridges and troughs, and where their disturbance was greatest the successive ridged folds are closely pressed together. The waves of the rock structure are then pushed to such steepness that their sides become parallel with each other, and the entire fold is driven

forward into an inclined position. The order of the strata on the lower side of the appressed fold is thus inverted; the originally highest and last-formed deposits there lie beneath older beds, in an overturned series. Subaërial erosion then wears down the undulations and the crests of the closely folded strata, often planing them off until a long section, crossing mountain ranges, passes from older to newer beds, and onward from newer to older, in several alternations, having throughout the whole a nearly constant steep dip. Owing to the interbedding of hard and enduring sandstone, quartzite, gneiss, and other rock formations, with more easily eroded limestone, shales, incoherent sandstones, or schists, the erosion commonly produces a new topography, making hollows and long valleys where the more erosible beds have been removed, and leaving ridges and mountain ranges of the harder rocks. More than this, when erosion has been continued through very long periods, it tends toward the ultimate result of removing the upward curved or anticlinal portions of the great folds and sparing the originally lower downward curved or synclinal portions, until valleys take the places which were originally occupied by the highest upheavals, while the original troughs, where the rocks were most compacted by pressure, remain now as the principal mountain ridges. Under denudation, the folded mountainous belt fulfils the prophecy: "Every valley shall be exalted, and every mountain and hill shall be made low."

The most perfect type which the world affords of this structure, or at least the example which has been most fully studied as to the age of its strata, the dates of their foldings and upheavals, and the effects of erosion, is the Appalachian mountain system. As made known by the brothers W. B. and H. D. Rogers and by later geologists, a vast series of Palæozoic strata, representing continuous deposition from the early Cambrian to the close of the Carboniferous period, is thrown into many long steep folds in the Appalachian ranges of Pennsylvania and the Virginias, making the southeast part of this mountain system, and into plateaus and gentle undulations in the Catskill, Alleghany, and Cumberland mountains, which are its northern and western portions. After the formation of the coal measures, the thick sediments that had been laid down in the subsiding eastern margin of the Palæozoic ocean, which extended westward over the present basins of the Laurentian lakes and the Mississippi, were compressed into folds and raised to constitute a mountain mass 1,000 miles long and 75 to 100 miles wide, with probably much greater altitude than now. During Permian and Triassic time, according to Professor W. M. Davis, this elevated area was channelled by rivers and finally was mostly worn down to a broad base-level or a moderately undulating expanse. Renewal of elevation, occurring in the Jurassic period, was probably attended with the remarkable overthrust faults, having apparently a maximum extent of about eleven miles of horizontal displacement, which have recently been studied out by C. W. Hayes, similar to the thrust-planes discovered by Peach and Horne in northwestern Scotland. Another cycle of base-level erosion is shown by Davis to have extended from the Jurassic upheaval to the end of the Cretaceous period, reducing the Appalachian mountains to a lowland tract, in part nearly flat and in part hilly, which he names the Schooley peneplain. This tract, almost a plain at the close of the Mesozoic era, was then a third time upheaved; and the present valleys of the Appalachian belt, divided by very long mountain ridges of uniform height, have been cut by river erosion during the Tertiary and Quaternary eras.

Closely associated with the foregoing are other folded groups and ranges of mountains, which Professor C. H. Hitchcock has named the Atlantic mountain system, first raised as mountain masses in the Cambrian and Silurian periods, long before the great Appalachian revolution terminating the Coal period. In order from northeast to southwest, this system comprises low mountains in Newfoundland and in the eastern provinces of Canada, south of the St. Lawrence; the mountains of Maine; the White mountains; the Green mountains; the Hoosac and Taconic ranges; the Hudson highlands; Schooley's mountain and other ranges in New Jersey; the South mountain in Pennsylvania; the Blue ridge in Virginia; and the Blue ridge, the Stone mountains, and the Iron, Bald, Smoky, and Unaka ranges, in North Carolina. This mountainous belt, extending nearly 2,000 miles, is everywhere characterized by overturned folds, and by intense metamorphism, the sedimentary strata, originally shales, sandstones, and conglomerates, being changed to crystalline schists, gneiss, and granite. Denudation of the Atlantic mountain system, and of lands stretching eastward over part of the present Atlantic ocean area, supplied the deposits which were upheaved in the building of the Appalachian ranges.

A still older Laurentian mountain system, first upfolded in the Archæan era, is to-day represented by the Adirondacks, the Laurentide highlands, and the mountains of Labrador, Baffin land, and Greenland. Asking, then, how the mountain-building forces of eastern North America have been manifested, we see that the upper part of the earth's crust here has been folded by pressure from the Atlantic toward the central area of the continent, exerted during certain epochs of mountain formation, which have alternated with long intervals of repose and of base-levelling by stream erosion. Three chief epochs of orogenic upheaval have produced the intimately blended Laurentian, Atlantic and Appalachian mountain systems, which geologists distinguish because of their diversity in age and in many of their physical features, but which geographers unite as the eastern mountainous belt of our continent. As a whole, it may perhaps properly be called the Appalachian or, better, the Appalachian-Laurentide belt.

Other examples of this structure are developed on the grandest scale in the Old World, comprising the Atlas mountains, the Pyrenees, the Alps, the Apennines, the Carpathians, the Balkans, the Caucasus, the Elburz, the Hindoo Koosh, and the Himalayas, together reaching from the Pillars of Hercules to the China sea. These complex mountain systems may collectively be called the Alp-Himalayan belt. During the Miocene, Pliocene, and Glacial periods, to the present time, compression has been exerted upon each side, upbuilding its mountain chains, which cover a length of about 8,000 miles, occupying a third part of a great circle. In North America, the Laurentian mountain system belongs to the remote beginning of the geologic record, and the Atlantic and Appalachian systems are very old, having repeatedly been almost base-levelled; but these principal mountains of northern Africa and of Europe and Asia are geologically very new, the highest being still in the growth of infancy and youth. When upward growth ceases, erosion triumphs and by slow degrees sweeps the mountain mass into the sea. The perpetuation of ancient mountain systems has depended on repeated upheavals, and in their present condition they are remnants spared from the erosion of areas lately elevated. Portions of this great Eurasian mountain belt began to be plicated and thrust up long before the Tertiary era, and doubtless some of its mountain systems were comparatively undisturbed during the Tertiary and Quaternary folding and upbuilding of the Alps and Himalayas; but mainly the prominence of the belt is due to the lateness of the plication and in part to its being now in progress.

Nearly all the principal mountain systems of the world have a folded structure, but in many instances they retain no semblance of their primal undulations and earliest contour. In the mountainous plateau of Scandinavia and its outlier, the Scottish highlands, only the bases of the ancient mountains remain. Eroded, perhaps repeatedly, almost to the sea level, these plicated areas have been again elevated and are now deeply incised with valleys, fiords, and lochs. In the western mountain belt of North and South America, a long and eventful history of extended plication and upheavals in many separated geologic epochs is more or less clearly revealed; but the latest accidents befalling this belt during the Quaternary era will call for special description under the fourth structural type, with which the earlier revolutions of this most prolonged mountain chain will be reviewed.

2. *Arched mountain ranges.*—Far less frequent than the foregoing, and indeed known only in parts of the Cordilleran belt of the western United States, is the arched structure, which may be best described in its most typical example, the Uinta range of northeastern Utah. According to Powell's report on the geology of these mountains, a great thickness of many rock formations has been here raised in an arch about 150 miles long from east to west and 30 to 40 miles wide. The strata range in age from the Archæan and Cambrian to

the Cretaceous and Tertiary, and they appear to have reposed horizontally, as laid down in the sea, until the end of the Cretaceous period. The upheaval took place during the Tertiary era, mostly in its earlier portion, and the whole extent of the upward arching was about five and a half miles. Erosion, however, has gone forward during the growth of the arch, so that the highest peaks of the range have an altitude of only about two and a half miles, or 13,000 feet. Upon each side of the Uinta arch and about its ends, the stratification is steeply inclined and occasionally cut by faults; but higher up the inclination diminishes and the strata extend across the top as a flattened dome, without folding or dislocation.

How were the mountain-building forces applied to form this arch? Its short extent in proportion to its width, and the absence of plication, make it difficult or impossible to refer it to lateral pressure, which has been regarded as the manner of application of the energy forming the great folded ranges. All the features of the Uinta range instead point to upward pressure as the form of mountain-building energy to which its elevation was due. It is very important, however, to note that the process of the Uinta elevation was so gradual and slow that the rivers which flowed across the area before its upheaval were not turned aside, being able to cut down their channels, which in the heart of the mountains are precipitous, narrow cañons, as fast as the elevation progressed. After the consideration of the remaining types of mountain structure, we shall further examine this question of the method and the origin of the diverse manifestations of mountain-building.

Adjacent to the east end of the Uinta arch, two similar but small upthrust mountains were formed at the same time and repeat the same structural type in its essential features, but they have sharply arched crests and their longer axes run from north to south, at right angles with the major axis of the Uinta range. These are Junction mountain, about 12 miles long and 4 miles wide, and Yampa mountain, 7 miles long and about 3 miles wide. Both are cut by the Yampa river, flowing directly through them in deep cañons, instead of passing around, thus showing that these very short upthrusts, like that of the larger range, were gradual, not sudden, in their development. The vertical extent of upward arching of the strata to form each of these mountains, counteracted meanwhile in large part by denudation, is believed to have been somewhat more than two miles; and this great elevation of so small areas was yet not too rapid to permit the river to keep pace with it in the downward cutting of its cañons.

3. *Domed mountains.* — The structural type here designated is exemplified by the Henry mountains in southern Utah, which have been elaborately studied by Gilbert. These mountains were formed as dome-shaped or bubble-like, but gigantic, uplifts of previously horizontal Carboniferous, Jura-Trias, Cretaceous, and Tertiary formations, by the volcanic injection of immense lenticular masses of porphyritic trachyte between the strata of the series. The injected lava mass is named by Gilbert a laccolite (cistern stone). Whereas in the first type of mountain structure the formerly horizontal strata were thrown into folds, and in the second were curved upward in great arches, they here were simply lifted quaquaversally, as a geologist would say, in vast domes. Mt. Ellsworth, the most southern of the Henry mountains, was lifted by only one laccolite; Mt. Holmes, the next northward, by two; Mts. Hillers and Pennell, next in order to the north, each by one large and several smaller laccolite intrusions; and Mt. Ellen, the most northern mountain of this group or range, was puffed up by many (perhaps thirty) of these cistern-like masses of lava. The Henry mountains extend about 35 miles from south-southeast to north-northwest, with a width of 5 to 10 miles; and their highest summits rise about 5,000 feet above the plateau of their base, or 11,000 feet above the sea.

From these summits the view embraces within distances of 50 to 120 miles northward, eastward, and southward, no less than five other mountain groups of this type, namely, the Sierra La Sal, the Abajo, La Lata, Carriso, and Navajo mountains; and 200 miles to the east the Elk mountains of Colorado belong to the same class. The Henry mountains and these other groups were all probably uplifted near the middle of the Eocene epoch, the first of the three divisions of the Tertiary era. They were contemporaneous with the growth of the Uinta range and the Junction and Yampa mountains;

but the Henry structure represents sudden lifting by the energy of volcanic inflows of molten rock, while the Uinta structure, as we have seen, represents a very gradual upheaval. The two cannot be referred to the same means of elevation, though their more remote causes were doubtless nearly related or identical. No laccolite mountains are known in other countries; and here they are found only in the region of plateaus which is intersected by the cañon of the Colorado.

4. *Tilted mountain ranges.* — Next to the west of the Colorado drainage area is the Great Basin of interior drainage, which returns all its rainfall again to the clouds by evaporation. Were the lakes of this arid region to grow by increased rainfall until they should flow across the lowest points of their water-sheds and send streams to the ocean, two of them would be similar in area to the great lakes of the St. Lawrence. Twice during the climatic changes of the glacial and postglacial epochs, these two lakes, named Bonneville and Lahontan, have so risen nearly or quite to overflowing, whereas now the former is represented by Great Salt lake in Utah, and the latter by Pyramid and Winnemucca lakes, with others, in Nevada. Close east of Lake Bonneville rises the Wahsatch range, and west and southwest of Lake Lahontan is the Sierra Nevada, both of which are examples of tilted mountain ranges. The Wahsatch has been elevated along fault lines which form its western boundary, adjacent to the area of Lake Bonneville and the present Great Salt lake. It is an immense mountain mass which has been tilted by upheaval of its western border and sinking of its eastern portion. The Sierra Nevada, on the other hand, has been upheaved along fault lines bounding it on the east, and is concisely described as principally a single great block of the earth's crust, about 300 miles long from north-northwest to south-southeast and 50 to 70 miles wide, tilted by elevation of its east side and depression of its west side. Between these grand mountain ranges which look toward each other on the east and west limits of the Great Basin, many minor ranges occur, trending from north to south, all of which have the same structure and origin through faulting and tilting, so that this is called by Powell the Basin type of mountain structure.

The great disturbances producing the Basin ranges were of late geologic date, in the early part of the Quaternary era. The resulting mountain ranges are still very young, geologically speaking, and therefore some of them rank among the most prominent on this continent. During more remote periods doubtless many ranges in various parts of the world have been formed in this way, their sites being now marked by profound faults which are clearly traceable, though the tilted mountains of the upheaved side of the faults have long since passed through youth, maturity, and old age, leaving no topographic evidence of their former existence.

Many stages of mountain-building have left their impress on the great Cordilleran belt of the western part of the United States and the Dominion of Canada. The Gold and Selkirk ranges of British Columbia, according to Dr. George M. Dawson, consist of Archæan, Cambrian, and Silurian formations, which were pushed up into mountain folds before the close of these very ancient divisions of geologic time. The auriferous slates of the Sierra Nevada, as Becker has shown, were similarly built up in a folded mountain range at the close of the Gault epoch in the Cretaceous period. During the ensuing long lapse of time to the end of the Tertiary era, this precursor of the Sierra Nevada range had been worn down to only a moderate elevation by the gnawing frosts, heat, rains, and running streams; but the beginning of the Quaternary era, according to Le Conte and Diller, brought revolutionary changes. The previously base-levelled region which now forms the Great Basin was then upheaved as a high plateau; intense volcanic activity was manifested in many parts of this area, and especially from the vicinity of Lassen Peak and Mt. Shasta northward to the Columbia river and eastward along the Snake river to the Yellowstone National Park; and long faults, running mostly from north to south, divided the distended region into a multitude of orographic blocks, which, being soon allowed to sink, became tilted in their subsidence and form the present Basin ranges.

If we attempt to correlate these events with the Quaternary glaciation of the northern part of our continent, they seem to have been contemporaneous with the maximum extension of the ice-sheet of the first Glacial epoch. The ice accumulation I have attributed, on evidence derived from fiords and from river channels now deeply submerged by the sea, to former great elevation of the glaciated areas, probably 3,000 to 4,000 feet higher than now. But the glacial and modified drift show that toward the end of each of our two principal glacial epochs the land on which the ice lay was depressed nearly to its present level or in part lower. This depression of the earth's crust I believe to have been caused by the vast weight of the ice-sheets; and, in the first Glacial epoch, we have the correlative somewhat sudden elevation of a contiguous area, with outpouring of lava and formation of tilted mountain ranges, in the Great Basin and north to the Columbia. During the long interglacial epoch very thick subaërial deposits, called by Russell adobe, were supplied by denudation of the mountains and spread on the lower parts of the Great Basin and in the San Joaquin valley; and the subsequent two flooded stages of Lakes Bonneville and Lahontan belong apparently to the second Glacial epoch and to a later or third epoch of glaciation in the northern part of the Cordilleran region.

Extending our view to embrace the entire belt of which the Rocky mountains, Sierra Nevada, and Coast range are parts in the United States, we see that it forms the western side of both South and North America. Its length from Cape Horn to Alaska is about 10,000 miles of a great circle, from which the irregular course of the chain is nowhere widely distant. These complex mountain systems, including the Andes, the mountains of Central America and Mexico, the Rocky mountains and parallel ranges west to the Pacific, and the Alaskan mountains, may be together named the Andes-Cordilleran belt. In Bolivia and Peru the highest portions of the Andes are found by David Forbes to be folded Silurian strata, which are so associated with Devonian, Carboniferous, and Permian formations as to imply that the principal epoch of mountain plication there, as of the Appalachian system, was at or near the close of the Palæozoic era. But later epochs of plication are also recognized in portions of the Andes, as likewise in the rocks of the Sierra Nevada, the

Wahsatch, and the Coast range in the western United States. Indeed, the last-named range, and the range which culminates in Mt. St. Elias, the former stated by Whitney to contain infolded Pliocene beds, and the latter found by Russell to consist of Pliocene or early Quaternary rocks, were formed by very late mountain-building, perhaps correlative, like the faulting and tilting of the Basin ranges, with great movements of the earth's crust producing and accompanying glaciation. The present height of the Andes, as of the Appalachian, Atlantic, and Laurentian mountain systems, and the Cordilleran ranges of the west part of this country and Canada, must be ascribed to Tertiary and Quaternary upheavals of this belt, portions of which had long before and at different times been folded and raised to mountain heights but afterward had suffered erosion almost or quite to a base-level.

5. *Erupted mountain ranges.* — Volcanic action has often been developed on a grand scale along the deep fissures and fault-planes which border and intersect tilted mountains and plateaus, as notably in the Andes and in Mexico, where it has built up very conspicuous volcanic cones of outpoured lavas and ejected blocks, bombs, lapilli, and ashes. Often, too, prolonged fissures, which may intersect each other (as in the Hawaiian islands), reach down through the earth's crust to lavas that well up and build mountain masses and plateaus, while the crust segments have been only slightly tilted and sometimes lie wholly beneath the sea level. Such eruptions form the Cascade range, the mountainous plateaus of Iceland and the much eroded Færöe islands, the Deccan plateau in India, the volcanic chains of the Sunda, Kurile, and Aleutian islands, and the Hawaiian island belt.

The Cascade range is a typical example of this class, having an extent of more than 500 miles from south to north across Oregon and Washington, showing a thickness of nearly 4,000 feet of lava where it is cut through by the Columbia, and bearing here and there volcanic peaks which rise to altitudes 10,000 to 14,000 feet above the sea. The eruptions producing this range took place during late Tertiary and early Quaternary time, being contemporaneous with the faulting and tilting of the Basin ranges, the Wahsatch, and the Sierra Nevada, and with the folding and upbuilding of the Coast range. As Jamieson and Alexander Winchell have well suggested, the outpouring of the vast lava floods of the Cordilleran belt in the United States, a portion of which forms the Cascade range, was probably in large part or wholly dependent on movements of elevation and subsidence of the adjacent glaciated area. Another erupted range, on a smaller scale but very interesting in its details as described by Russell, belonging to the Quaternary era and partly to the recent epoch, lies close south of Lake Mono in California.

6. *Eroded mountain ranges.* — The form and contour of nearly all mountains, excepting volcanic cones, have been given to them by the sculpturing agencies of subaërial denudation. This is true of each of the foregoing classes, where mountain-building energy has supplied the mass, but erosion has shaped the slopes, ridges, and peaks, the ravines and valleys. These five classes of mountain ranges have been sculptured by erosion, where previous mountain-building has raised limited areas to an exceptional altitude. But besides these orogenic upheavals, there have been broader uplifts of the whole or large parts of continents, which Gilbert and White have called epirogenic movements. The sixth class of mountain ranges, here to be noticed, is distinguished from all the preceding by its comprising mountains which owe their origin to no definite mountain-building process, being simply remnants of extensive areas which have been uplifted by epirogenic energy as great plains and since have been deeply eroded.

The plains which slowly rise from the Mississippi valley and Manitoba westward to the foot of the Rocky mountains afford examples of this type of mountain structure. Perhaps the most striking is the range of the Crazy mountains in Montana, which lies immediately north of the Yellowstone river near Livingston and is conspicuously seen from the Northern Pacific railroad. These mountains trend slightly west of north, and extend about 40 miles with a width of 15 miles, attaining an elevation of 11,178 feet above the sea and 5,000 to 6,000 feet above the prairies at their base. Their structure has been thoroughly studied by Wolff, who finds that they consist of late Cretaceous strata, soft sandstones, nearly horizontal in stratification, intersected by a network of eruptive dikes. The more enduring igneous rocks have preserved this range, while an average denudation of not less than one mile in vertical amount reduced all the surrounding country to a base-level of erosion. The Highwood mountains, about 25 miles east of Great Falls, Montana, having a height of 7,600 feet above the sea or about 3,500 feet above their base, are described by Davis as displaying the same structure and therefore similarly testifying of great denudation. This erosion of the Great Plains was probably in progress during the whole Tertiary era. Around Turtle mountain, on the boundary between North Dakota and Manitoba, its amount was not less than 500 to 1,000 feet.

Original epirogenic uplifting of these plains took place at the end of the Cretaceous period, or during the early part of the Eocene. Thence onward through the Tertiary era, rains, creeks, and rivers were reducing this region nearly to the sea level, excepting remnants like the Crazy, Highwood, and Turtle mountains, which were being sculptured approximately to their present form. But the Tertiary era seems to have been terminated, and the Quaternary ushered in, by a new epirogenic differential uplifting of this continent, causing the accumulation of the ice-sheet of the first Glacial epoch. The time of great elevation initiating the Ice age, and the ensuing long interglacial epoch, before the second glaciation, appear to have permitted rivers in North Dakota and Manitoba to wear away a considerable part of the Tertiary base-levelled plain, from its former eastern margin to the remarkable escarpment, in part a small eroded mountain range, of the Pembina, Riding, and Duck mountains and the Porcupine and Pasquia hills, which form the west border of the Red river valley plain and of the lowland with large lakes in central Manitoba.

Reviewing this classification of mountain ranges for the purpose of discovering what elements of diversity and of unity characterize the manifestations of mountain-building energy, we see this to be of two kinds, the second being presented under four phases. The first kind of mountain-building energy, producing folds, is evidently lateral pressure, and is ascribed by geologists and physicists to the contraction of the earth's mass by its secular cooling, with resulting adaptation of the rigid outer part of the crust to the shrinking interior. The second is energy acting vertically upward, which has produced the four other types of constructive mountain ranges and masses by diverse phases of its manifestation, namely, the slow arching of limited areas, as the Uinta, Junction, and Yampa mountains; the sudden volcanic lifting of the laccolite mountains; the upheaval and subsidence, with faulting and tilting, of the Basin ranges; and the outpouring of lavas, as in the Cascade range. Each of these four phases of vertically acting energy depends upon a viscous and plastic, neither solid nor perfectly liquid, condition of the earth's interior. Greater pressure of some portions of the crust than of others upon the plastic interior would induce each phase of upward energy in mountain-building. Where isolated blocks of the crust yielded slowly to the resulting quasi-hydrostatic pressure of the interior, mountains of the Uinta type were formed; but large areas, as the Great Basin, being swelled upward and anon subsiding, as the interior pressure increased and diminished, have become marked by tilted mountain ranges. Where the relations of intense heat, immense pressure, and chemical influences, with presence of water or its further ingress, have allowed portions of the interior, often of great extent, to become liquid lava, its extravasation by the same pressure has formed laccolite mountains and erupted mountain masses, while many volcanic cones have been mainly built up of fragments of solidified lava, much of it so fine as to be called ashes, explosively ejected.

In an appendix of Wright's "Ice Age in North America," I have pointed out the source of the relationship by which these two kinds of mountain-building energy are united, both being caused by the earth's contraction in cooling, and the second or upwardly acting kind of energy being dependent on the first in the intermittent and occasional relief of stress of the earth's crust by its folding along the great orographic belts. Between the epochs of mountain-building by plication, the diminution of the earth's mass produces epirogenic distortion of the crust, by the elevation of certain large areas and the depression of others, with resulting inequalities of pressure upon different portions of the interior; and these effects have been greatest immediately before relief has been given by the formation of folded mountain ranges. There have been two epochs pre-eminently distinguished by extensive mountain-plication, one occurring at the close of the Palæozoic era, and another progressing through the Tertiary and culminating at the beginning of the Quaternary era, introducing the Ice age. During the last, besides plication of the Coast range, of the Alps, and the Himalayas, a very extraordinary development of tilted mountain ranges, and outpouring of lavas on an almost unprecedented scale, have taken place in the Great Basin and the region crossed by the Snake and Columbia rivers. With the culminations of both of these great epochs of mountain-building, so widely separated by the Mesozoic and Tertiary eras, glaciation has been remarkably associated, and indeed the ice accumulation appears to have been caused by the epirogenic and orogenic uplifts of continental plateaus and mountain ranges. Since the disturbances, with glaciation, closing Palæozoic time, the same combination of events has not recurred until the Quaternary era, which is not only exceptional in its accumulation of ice-sheets, but also in its numerous and widely extended movements of elevation and subsidence, and in its mountain-building and renewed upheavals of formerly base-levelled mountain belts. The earth's surface is probably now made more varied, beautiful, and grand, by the existence of many lofty mountain ranges, than has been its average condition during the previous long eras of geologic history.

In the Sierra Madre Mountains.

By Charles E. Fay.

Lying in the door of my tent at Tamworth with the delectable peaks of the Sandwich range before me, I seek to recall the experiences of a year ago in Southern California, stimulated by the picture of San Antonio Mountain which serves as frontispiece to the present issue of Appalachia.

Scarcely could there be a greater contrast. The cool, balsamic air, the morning sky already piled with cumulus cloud prophetic of showers ere mid-afternoon, the green fields cut by teeming brooks undulating away to meet the darker forest green that drapes the varied shapes of Whiteface, Passaconnaway, Paugus, and the lower slopes of Chocorua, are a striking antithesis to what we looked on there. These mountains woo you, and there is an anticipated satisfaction in the promise made yourself to stand on every one of the peaks within your range of vision, attaining them by way of pleasant journeys through ferny, mossy, pathless woods.

But in Southern California the mountains do not invite one, — at least, not for their own sakes. The conditions of climbing are most unfavorable. The summer heat is intense. They lie beyond an unattractive stretch; for the grass and flowers that in spring cover in wonderful profusion the ground that slopes upward to the sudden beginning of the steep foot-hills have withered, and in July all is parched and barren. The scattered live-oaks in the foreground, domineered by the will of the prevailing wind, have a half-frightened air; nothing of the repose of our maples, oaks, and white pines. The mountains themselves, rising with an almost monotonous uniformity of grade, are also burned as dry as a cinder, their dead white rocks pallidly reflecting the remorseless sunlight. Not until near the summits or deep in the cañons do you find forest trees. The dull vegetation of the slopes of lesser altitude is of a shrubbery hard to penetrate, the most common sorts being a so-called grease-wood (not the plant known in Colorado by that name), and a disagreeable thorn-bush, which, however slightly broken as you force your way through it, gives forth a sticky milk-white juice ; less frequent is the manzanita, its smooth reddish brown wood being prettier to the eye than it is yielding to the push. Then, to cap a climax of undesirables, these Dantesque slopes are prolific in rattlesnakes, against which one must be constantly upon his guard. Each time one of the myriad little lizards — " swifts " they call them there — darts from under a rustling bush and over a mossless stone, you start back, and smile at your lack of self-control. Especially does this danger haunt you if you have recently put down your hand within four inches of one of the dreaded reptiles, — one of the experiences of our first climb. No ; the Sierra Madre Mountains are not alluring to the Eastern climber.

Still the heights themselves, if not the getting there, seem to have an attraction for those who are acclimated. Wilson's Peak, near Pasadena, upon whose principal summit is located the station of Harvard College Observatory, has two " hotel-camps " on either side near the top, which are much frequented in the summer. A seven-mile trail leads along the sloping sides of the Santa Anita Cañon and one of its tributaries to the summit, — a trail travelled daily during the season by small trains of *burros* bearing visitors and supplies, all enveloped much of the way in a cloud of choking dust into which the hoofs of the animals have pulverized the baked soil to a depth of from one to three inches. At one of these unique resorts, Peter Steil's, we weathered through one of the hot spells of last July. Steil's Camp is perched on a short, narrow col, graded level for the purpose, some 500 feet below the observatory, on the southern side of the mountain. Its elevation therefore is about 5,100 feet, that is, nearly at the altitude of Mt. Lafayette ; and yet the thermometer registered in the middle nineties every day during our stay, and we did not see it below 87° even at night ! The lovely prospect was dimmed by a haze, composed doubtless in large proportion of the plentiful dust of Southern California, so that we could only indistinctly make out the broad expanse of the near-lying Pacific ; yet the highlands of the Santa Catalina Islands, more than twenty miles off shore, were plainly visible over this hazy substratum. While retaining pleasant memories of our host, his family, and agreeable guests, I cannot truthfully affirm that tent-life on Wilson's Peak contributed anything to inspiring a love for the Sierra Madre Mountains.

As little did our trip to Mt. Disappointment, made by way of Switzer's Camp,— a yet stranger resort of Nature-seekers. It lies deep in the heart of the mountains in the bottom of a profound ravine, and is reached by an eight-mile journey, chiefly by *burro*, from the mouth of the cañon of the Arroyo Seco,— in summer a small brook that yields all its exiguous flow to help irrigate pleasant Pasadena. The rarity of flowing water in a rainless land renders the presence of even a little stream a source of joy, and this brook with the shade it fosters is what invites city-dwellers to old Switzer's remote but hospitable camp. To one coming from the richly watered East there is something almost pathetic about this resort to a summer retreat whose view is limited to a few hundred feet in any direction. To reach the summit of Mt. Disappointment, you must abandon the cool cañon and scale the steep, dusty ridges that descend into it. Few, we fancy, are disposed to seek Disappointment at this cost, notwithstanding that Switzer's enterprise has made a good trail to the summit.

Yet in recalling our four weeks of generally uninspiring experiences among these mountains, one marked exception stands forth in bright relief,— the ascent of San Antonio Mountain, or "Old Baldy" as it is called by those who prize a homely familiarity above the rich utterance of the Spanish tongue. It is one of the giants of Southern California, being the highest of the summits west of San Bernardino. It rises 10,000 feet above the sea, and more than 9,000 feet above the level of the pretty towns of Pomona and Ontario, which lie out on the plains to the southward, five or six miles from the base of its foot-hills. Its relative height therefore is greater by at least a thousand feet than that of any of the peaks of the Rocky Mountains, with their 14,000 feet and more of absolute altitude. Hence in attaining its summit, we made the highest ascent we had ever undertaken, though only a few weeks before we had been 13,400 feet above the sea-level in Colorado. San Bernardino Mountain and San Jacinto, isolated peaks several miles to the east and southeast, rise one or two thousand feet higher. The latter is a particularly fine peak, not unlike in the outline of its rocky crest to Mt. Chocorua as seen from the east or west, yet on a far grander scale. I am sure one could love that mountain, which seems to rise above the meannesses that gird about the Sierra Madre range.

Before describing our visit to San Antonio Mountain, a few words concerning the position and general aspect of the group of which it forms a part. The Sierra Madre Mountains are an east and west range, or rather complex of minor ranges, lying between the Mojave Desert on the north and that fertile district which Mr. Charles Dudley Warner has characterized as "our Italy," the real Southern California, near whose northern limits lie Los Angeles, Pasadena, and the line of fruit-growing colonies eastward to Riverside and San Bernardino. The limits of the range in the other direction are not so easily stated, as mountains reach from the southern extension of the Sierra Nevada to the ocean beyond Santa Barbara; but the section to which the name "Sierra Madre" seems to be principally applied lies between the Cajon Pass on the east, through which the Santa Fé Railroad finds its way into "our Italy," and the less bold pass on the west which furnishes a rival way of communication to the Southern Pacific Railroad. This at least comprehends its principal portion, which covers an area of from fifteen to twenty miles in breadth by perhaps fifty to sixty in length. The most characteristic feature of these mountains is the way in which they are interlaced by cañons, or, in other terms, the immense number of ridges and spurs into which the mass originally upheaved has been sculptured. Again, these spurs are of a peculiar character, their sides sloping regularly down like those of a roof from a clearly defined ridge-line, itself sharply descending. These characteristics are pretty clearly shown in Plate X. Four large cañons can easily be distinguished, or inferred, lying between the spectator and the domed mass of San Antonio. If now one examines the nearest large ridge on the right in the foreground, he can count six lateral spurs running down into the cañon, the ridge-lines of the last three and a fourth beyond looking as if drawn with parallel-ruler. These sharp lines give a peculiar appearance to the landscape, which is even more accentuated in winter when a light snow is sprinkled over the ridges, as is shown in some excellent winter views taken last year from the summit of Wilson's Peak by Mr. White, to whose camera we owe our illustration. The foreground of this picture also gives a very correct impression of the nature of the ground, excepting the pitiful dryness. A luxuriant specimen of the yucca, or "Spanish bayonet," adds its confirmation to what has already been said in disparagement of the region for the climber. This semi-tropical plant is, nevertheless, one of the most interesting features of the flora; and when it has sent up its tall columnar stalk and crowned it with a capital of blossoms, one forgets at the sight of its beauty the inhospitable character of the vegetable porcupine at its base.

Our ascent of San Antonio Mountain was made under very pleasant auspices. The boards of trade of the twin colonies of Pomona and Ontario, through a chosen committee, had given Mr. J. R. Edmands and myself — as representative of an enterprise in which they were interested — a most cordial reception; they had shown us the wealth of their young towns, already declaring itself in prolific orchards of peach, apricot, nectarine, and prune, and an immense acreage of orange groves; they had plied us with the choicest specimens of those orchards, just yielding their abundant crops; and now they put at our disposal two young men with mules and camp equipage to explore Cucamonga Mountain and ascend San Antonio. The boys and their mules were already "up in the cañon" awaiting our coming. For the past few days they had been constructing a mule-path for our ascent of Cucamonga, as our outfit was considerable. To Dr. B. H. Fairchild and his wife we were under special obligations for their generous hospitality, and it was from their far-viewing ranch, well up toward the foot-hills, that we made our start. Here we donned woollen shirts and knickerbockers, and mounted into the job wagon which was to carry us and our supplies as far up San Antonio Cañon as a team may be driven.

This cañon is one of the largest among the Sierra Madre

Mountains, and runs in a north and south direction on the opposite side of San Antonio to that seen in Plate X. It opens in a broad gateway, perhaps a half-mile in width, between a spur from the western peak of the twin Cucamongas — the one we were to ascend — on the right, and an outlier of San Antonio on the left; it heads in a lofty ridge that connects "Baldy" with Telegraph Peak and so on to the Cucamongas. Its chief tributary is Ice House Cañon, beloved of rattlesnakes, which turns eastward along the ridge just mentioned. The floor of the main cañon rises rapidly, making a swift stream of San Antonio Creek, all of whose water in the summer season is apportioned to Pomona and Ontario. Just above where it enters the aqueduct, the stream has a breadth of perhaps fifteen feet, and flows in a clearly defined bed; but in the spring when the snows are melting, it becomes a limitless torrent, and nearly the entire breadth of the lower cañon shows evidence of its fury; indeed the marks of devastation extend far out upon the plain. The same is true in general of the streams of the region. The wreckage below the Flume, or any New Hampshire stream that has carried the débris of some great slide, will give an idea of the character of the ground over which the alleged "road" finds its way the first four miles or more beyond the gate of the cañon to its terminus at Spring Hill. All is deeply strewn with coarse gravel and rounded stones of all sizes. Only here and there shrubs have found opportunity to grow, yet along the margin of the creek they have attained some size. The road is apparently the course followed by the first team entering the cañon after a freshet, the larger stones being removed; later comers naturally choosing the same course, the stony rut has become clearly marked. Eight times it crosses the torrent by dubious fords, where one can fancy all sorts of new obstructions beneath the tumbling waters. Along such a road we passed on the afternoon of August 1, and reached Spring Hill about five o'clock.

Here we found the pleasantest of the mountain retreats that we visited. The cañon bed has changed its character. Now contracted to pass the promontory giving its name to the place, the bottom is covered with a growth of good-sized trees, principally alder, which here attain dimensions unknown with us, some being forty or fifty feet high with trunks a foot and more in diameter. Their smooth boles had proved too inviting to the jack-knives of ambitious or spooney youth, and nearly all were defaced with initials, in single or double sets, the pairs sometimes interlinked with a heart. This form of telling one's love may pass muster for one Orlando, but loses its interest when appropriated by a score or more in the same grove.[1] Tents were scattered here and there, some of them prettily decorated with sylvan adornments. The campers were residents of Ontario, largely young people enjoying their "summer in a cañon." The locality is rendered the more homelike to an Easterner by the existence close at hand of a mossy fern-draped flume with a graceful cascade, which might have been imported from the New Hampshire hills,—the more charming for its unexpectedness.

Making the acquaintance of our boys, we awaited the transfer of our supplies to their mules; then, joined by a new-made acquaintance among the campers, who desired to make the Cucamonga trip with us, at about six o'clock we set out for Dell's Camp, four miles higher up. The path is now little more than a *burro* trail, yet with signs of once having been a fairly good road for the services of the miners at the head of the cañon. It rises by a grade for the most part easy, yet at one place, perhaps a mile beyond Spring Hill, it makes a sudden upward jump of 500 feet, in a transverse ridge called "the Hogback." The descent on the other side is but slight. On the right we heard the rush of a waterfall where the stream had cut its way through. Beyond "the Hogback" for a few miles the cañon grows more hospitable, the wreckage of the torrent being less conspicuous; indeed, as we approached Dell's, we found actual cultivation in the form of a small field of alfalfa. This change is due in large part to the higher altitude; for we have climbed 3,700 feet since leaving Pomona, Dell's Camp being at an elevation of about 4,600 feet, if my memory serves me.

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[1] This passion for mutilating trees seems to be widespread in California. When the obvious love of Nature of the inhabitants finds expression in a Sierra Club, one of its useful functions will be to conduct a crusade against this vandalism.

We reached it just at dusk, — a small log cabin with a single room, and a tent of nearly the same size, in which were three or four beds, Dell having with him for the time being a few guests, prospectors and invalids, young men able to endure the rough life of the place. Our boys made themselves a bivouac in the trees near by, and Mr. Edmands and I accepted the hospitality of the proprietor, who gave up his cabin and bed to us. To it we retired after a good supper, which my companion with his usual skill had prepared from our lavish supplies. The hospitality of the cabin was shared that night by bats that fluttered crazily about, not knowing enough to find their way out by the wide-open door. We had to do discredit to the proprietor's hospitable character by drawing the line at the *burro* that some time after midnight seemed inclined to follow his peering head in at that open door, and close it against him. Mr. Dell keeps a few of these animals for persons desiring their aid in ascending San Antonio, and his camp, although aside from the trail, is a half-way house for excursionists.

The next three days were spent in making our investigation of the western Cucamonga Mountain, ascending it by way of Ice House Cañon and the trail that had been built for us. Only one rattlesnake was killed on the way. Mr. Edmands made several photographs with the 8 × 10 camera that with its belongings made the heaviest part of our equipage. The only result of public interest from our expedition was the determination by aneroid of the elevation of the mountain, approximately 8,700 feet. The eastern peak seemed by levelling to be of the same height, which is some 2,000 feet more than what is credited to them in the neighborhood.

Returning from this, our principal expedition, we reached Dell's in ample season to carry out our plan for camping that night at Bear Flat, some three miles up on the trail to "Baldy;" but our boys, probably in the hope of lengthening their engagement, declined to go on, and in so annoying a manner that their services were immediately dispensed with. The alleged lateness of the hour and weariness did not hinder their at once departing for Spring Hill, while we prepared to pass a second night in Dell's cabin, having meantime secured his services to pack the camera and two days' supplies on the anticipated trip.

On the morrow, after a comfortable breakfast, we started. The trail we were to take was one recently built by Dell at the instance of Dr. Fairchild, who for some years has regarded San Antonio Mountain as an available site for an astronomical observatory. This trail has quite superseded the former one, which continued to the head of the cañon, up to the col on the ridge already referred to, then directly up the east side of the great dome. To enter the new trail, one retraces the path to Spring Hill for a quarter of a mile and enters a narrow side-cañon, through which flows a small tributary of San Antonio Creek. The path here is very pretty, being shaded by the trees which line the ravine, and now and then crossing the rill to secure the best footing. Shortly it leaves the bed of the ravine and begins to zig-zag for a distance up the right-hand slope, then follows a continuous slightly ascending grade still in the shade, at the end of which, less than 1,000 feet higher than our starting-point at Dell's, it comes out upon a kind of upland pasture, which forms the head of the ravine lying on the opposite side from Dell's of a spur of the great south ridge of San Antonio Mountain, which forms the sky-line on the right in Plate X. This is Bear Flat; and here, in a little tent belonging to our guide, we expected to pass the night on descending the peak. Accordingly a part of our supplies were deposited here.

We now had to mount to the crest of the greater ridge, the least agreeable part of the way, up a long series of zig-zags in the hot sun, — typical Sierra Madre climbing. But this purgatory of forty minutes prepares one for the joy that attends his arrival on the crest. We reached it not far from where the sky-line is cut off on the right of the plate; and now the view, which up to this time had been limited by the Cucamonga ridges to the region which we had been exploring for a few days, suddenly broadened to the westward, and we saw before us a view like our frontispiece, only far more extended in breadth and depth. Familiar objects, or even such as can be identified, always give an additional zest to a newly opening prospect; and there lay in our horizon Wilson's

Peak and all the mountains we had come to know during our stay upon it.

We halted here to photograph those peaks. During our delay we noticed an unwonted change in the sky, and ventured the remark that if we saw that kind of clouds gathering in one of our Eastern trips we should prepare for a drenching, but of course in a rainless country they could not portend a downpour. Dell did not seem inclined to vouch for the issue. As we continued our way up the ridge, now offering pleasanter footing and more and more plentifully sprinkled with sturdy pines, we heard the rumble of thunder, — quite unobtrusive, however, as if it felt how out of place it was. By the time we were ready to halt for our lunch, rain had actually set in. The unexpected had happened. We gathered under the dense crown of a mountain pine, while our guide built a fire close at hand to dry us if it came to a heavy shower. There was something so suggestive of home in this episode that it almost added to the pleasure of our noon meal, especially as we believed the storm to be short-lived, and hence that our ascent would not be rendered vain. But the mists about us were growing denser, the rain-drops more frequent. Desiring to lose no time, my companion and I decided to move on, and accomplish the 1,500 feet that still remained; but as a camera would be of no use in the clouds, Dell was left behind with his jennet, with instructions to come on if the rain ceased within a reasonable time. As if in malice, the rain now set in in good earnest. By some odd circumstances Mr. Edmands had with him a rubber coat. By an even stranger fatality mine was in my trunk at Pomona, after curious wanderings in search of me. I had by oversight left it behind, together with a heavy Cardigan jacket, at Ouray in Colorado. Committed to the express company, they had followed me 2,000 miles, and by the irony of fate had been delivered over to me in the dry torridity of Steil's lofty camp! And this was the sole and phenomenal occasion of all our California experience in which they could have been of use! However, by judiciously pausing under the big pines when the rain fell fastest, it was possible to keep oneself passably dry, and in due time, passing beyond the limit of trees which extend to within a few hundred feet of the summit on the eastern side, we braved the rain and reached the cairn that crowns the great dome at about half-past three o'clock.

All was enveloped in mist, and the wind was chilly. Sitting under the lee of the cairn, we wondered whether we had not been too sanguine as to the brevity of the storm. The demons of the air that could contrive a summer shower in a land where such things were unknown, where people planning an excursion never have to put in the proviso "if it is fair," could just as easily convert it into a long storm. But we had come up here to see the view, and did not feel inclined to go down without it. We would wait awhile, at least. Meantime something must be done to get up a circulation. Yonder a few rods below us on the east side lay a patch of snow. We proceeded to investigate it. Though of no great size, only a few hundred square feet of surface and evidently very shallow, it nevertheless proved exceedingly interesting. For the first time we looked upon red snow. Nearly the entire surface was ruddy, and in patches it showed decided color, snowballs made from these portions having a purplish hue.

The rain had now almost ceased falling, but neither the flush of the snow nor of excitement had increased our bodily comfort. Oh for a good pine log and the necessary tinder! Was it in answer to this wish that, turning toward the north side of the dome, we seemed to see a rising thread of smoke? We hastened thither, and to our great satisfaction found a fire furiously eating into the heart of a large pine log,—a fire left burning by recent visitors. When once kindled, these pitchy pine logs are almost inextinguishable, and the rain had made no impression upon this. For a yard or more about it all was bone dry. We quickly placed ourselves within the charmed circle. Our fireward side soon steamed into dryness, and then we turned to it the other also. Though the drizzle still continued intermittently, by judicious turning we were able to defy the persistent shower.

Meantime the thinning of the mist about us had enabled us to observe the character of the summit,—a flattened dome strewn with small fragments of stone, much more like Mt. Pleasant than Mt. Washington, though far larger than either.

A few hundred yards to the southwest a secondary dome rose from the main mass perhaps a hundred feet less in altitude. On the north and northwest the mountain fell away more abruptly, and perhaps a mile distant beyond a deep col rose the conical peak that is seen whitened with snow on the left of the principal summit in Plate X. This picture was taken some months earlier than our visit. No snow was now visible on that peak, but between us and the col, beginning perhaps 300 feet below where we stood by the fire, lay a mass which it seemed worth while to explore. It seemed to lie in a shallow trough, and to be piled up toward its median line. The depth at the middle was possibly fifteen feet; and the width, as nearly as I can remember, some fifty feet on the average. The snow was of course granular, and admitted the heels of one's shoes just enough to make it safe to run down the slope at good speed. This I did, and estimated its length at about 400 yards. So large a mass seemed extraordinary, considering the intense heat which we found at high elevations in Southern California.

But now came the grand reward of our climb and of our waiting. The rain ceased entirely and the clouds began to roll away, disclosing an immense prospect, the richer in color by the effects of the cloud masses. The rain had washed the air transparent. There in the north lay the Mojave Desert transformed into a paradise by the magic effect of the light, green and purple, like late-afternoon effects upon a prairie, all softened and toned by distance. Weirdly shaped hills arose far out upon its borders, and far beyond lay the dusky phantoms of the Sierra Nevada. Among them we thought we could distinguish Mt. Whitney, knowing its bearing. In the opposite direction, less distinct as the storm had moved that way, lay the Pacific, extending to the vague horizon, and again the heights of the Santa Catalina Islands rising into clearer vision. In the middle distance the orchards and groves of the fruit-growing colonies checkered broad patches with lighter or darker green. In the east towered San Bernardino and San Jacinto, the latter more admirable than ever, with rosy light flushing its rocky head and mane. Yet, more striking than all, grander and more beautiful than all, the wonderful landscape of the clouds and mists themselves, varying with their lifting and parting. On every hand, at elevations slightly different from our own, were cloud masses of every conceivable and shifting shape, while the bottoms of the deep gorges that fell away beneath us and the beds of the long cañons reaching for miles into the heart of the mountains were the resting-places of still rivers of woolly mist. Never had I seen so glorious a display; not from the summit of Mt. Washington on the last day of the notable field-meeting; not from the summit of Mt. Liberty on the morning after our camping high up on its eastern slope; not the sunrise view on the last morning of our ever memorable Adirondack excursion when we saw the Green Mountains transfigured, — though that was richer in color, and its golden tints will never fade in memory.

More than repaid for our labor and discomfort, we began our descent, rejoined Mr. Dell where we had left him, and descended together to Bear Flat. On approaching the tent where we had bestowed part of our goods and expected to pass the night, glad to be so near shelter and rest, we discovered that it was already occupied, and by ladies. The men of the party were engaged in building a fire in front of it. They had started from their camp at Spring Hill intending to bivouac at Bear Flat and ascend the mountain the next day, had been surprised by the rain and thoroughly drenched. Of course they had no idea of taking possession of the tent, seeing the goods lying about, but merely sought its comfort until the rightful occupants should appear. It was not too late for our party to go out to Dell's, but on the way down my companion had decided that he must return to the summit on the morrow to determine one or two important matters. A consultation resulted in a decision to invite the present occupants to retain possession of the tent, Dell would improvise a shelter for two, while I would simplify matters 'and render the present stock of supplies sufficient for the extended period by going down to the camp; a comfortable night in a bed would compensate for added weariness, and I would go out of the cañon the next forenoon, and await Mr. Edmands at Dr. Fairchild's.

These deliberations had taken time, and it was verging upon dusk as I bade them good-by and entered the wooded portion of the trail. Despite my hurried gait, all light had faded by the time I reached the lower end of the zig-zags; and the lower part of the way in the narrow cañon bottom that had been so pretty in the morning was traversed *à tatons* in inky darkness, finding the path with my feet. At the crossings of the brook this resource failed, and much time was spent beating about the bush to recover the lost trail. But all things have an end, and finally the junction was reached. The cobble-stones of San Antonio Cañon and its plain path were a welcome exchange for the softer uncertainties of the other. The distance to Dell's Camp was speedily traversed, and by nine o'clock the sole remaining guest in the tent turned out to greet the return of a wet, weary, but contented mountaineer.

A Trip to the Seven Ponds.

By H. H. Campbell.

Read December 10, 1890.

In 1889 the Appalachian Mountain Club visited the northwestern corner of the Pine Tree State, and pitched its tents on Students' Island in Mooselucmaguntic Lake. Looking northward from that camp, the horizon is bounded by the wooded slopes of Deer Mountain and the Kennebago Chain. Beyond these lies the wilderness in whose darkness the Magalloway, the Cupsuptic, and the Kennebago have their birth. Into this region of untrodden forest and virgin ponds this story will blaze a trail.

The Magalloway system has been known and frequented for many years. The lower part of the river has been ruined by the crowd of common murderers who claim the name of sportsmen; but under the rule of John Danforth, the Parmachenee district has been protected from the common herd. Within the last year the Parmachenee Club has leased for a private preserve the upper watershed of the Magalloway and the Cupsuptic, — a fact which renders any other information concerning these two valleys superfluous to the outside world.

The Kennebago River is navigable for several miles from its outlet into the Big Lake. There comes then a stretch of about three miles which is practically impassable; and at the head of these rapids is a fall of some thirty feet. The best way to reach Kennebago Lake is by a buckboard road from Rangeley. Over this route, and beyond Kennebago to the Seven Ponds our journey begins to-day. As there is no real camping to be done, our luggage reduces itself to a fly-rod with its proper accompaniments, and such articles of the toilet as may be carried in a coat-pocket. To those who have never indulged in the sport of fly-fishing we will merely say that it would be an act of base ingratitude to prodigal nature, as well as a grievous disappointment to impatient trout, to visit the Seven Ponds without a rod and reel.

The rude buckboard drives up in front of the hotel in Rangeley; and in company with the guide we stow ourselves away between sacks of onions and other groceries destined for the Kennebago Hotel. It is about nine miles from Rangeley to the lake; and the usual custom is to ride two miles and a half to the top of the high hill north of the village, and walk the rest of the way. The first trip over the rocks, stumps, mud, and corduroy that form the last part of the carry will justify this method. If people must take luggage, the buckboard saves the trouble of carrying it; but as a public conveyance, the vehicle is a dismal failure. The summit of the hill is several hundred feet above Rangeley, and commands an excellent view of Mt. Abraham and Mt. Saddleback, as well as their neighboring hills. Rangeley Lake lies partly in view, and from favored points a range of the White Mountains is just visible over the ridge that forms the lake's southwestern boundary. The road winds down the other side of the crest, passing through one or two deserted clearings, and crosses a little stream that comes from Long Pond, only a stone's-throw on the left. This water flows into the Dead River of the Kennebec system, which thus invades the realm of the Androscoggin. As the way rises again, it traverses a strip where a fire swept through many years ago. Away off over the wide lowland on the right it left the almost ineffaceable record of its march until it died on the summit of a hillock in the shadow of Mt. Abraham. A little farther the path leaves the sunshine and cuts its way into the great forest that spreads to the east and west and north, knowing no break until it wanders into the valleys of the St. Lawrence. Crossing many a little rivulet, and rounding a spur of the ridge upon the left, an hour's walk brings us to the hotel at the head of Kennebago Lake.

A hotel in the wilderness is an insult to Nature at the best, but this one possesses some redeeming features. There is not a carpet in the establishment. The walls are innocent of plastering, and conversation can be carried on between neighboring chambers without the slightest regard to the separating partitions. Everything about the place is neat and clean, and the food is as toothsome as it is plentiful. There is no burglar-proof safe for jewelry. A fly-rod is the most valuable possession, and this is carefully laid upon pegs on the porch outside. No one will touch it, for it is a heinous crime to meddle with the rod of your most intimate friend. The hotel generally has about fifteen or twenty guests at the height of the season. It commands a view of the entire lake, with the West Kennebago Mountains rising just beyond the northern end and marking the watershed of the river. The shores are lined with trees to the water's edge, as no lumbering operations have been carried on. At the Falls, a mile below, a dam is built across the stream; but this is merely to give storage in the spring to boom the logs on the rapid river below. In such cases the water is backed into the lake; but as it is only for a short time, no injury is done to the shore. The fishing in the lake is very good, and will continue so as long as present practices are kept up; for it is the rule here and in all the tributary waters that no man shall kill a fish unless he intends to eat it. All fishing is done with a fly, and fish are put back into the water with no worse injury than a pricked upper lip and a little surprise. All true sportsmen willingly follow this unwritten law, and others are shamed into its observance.

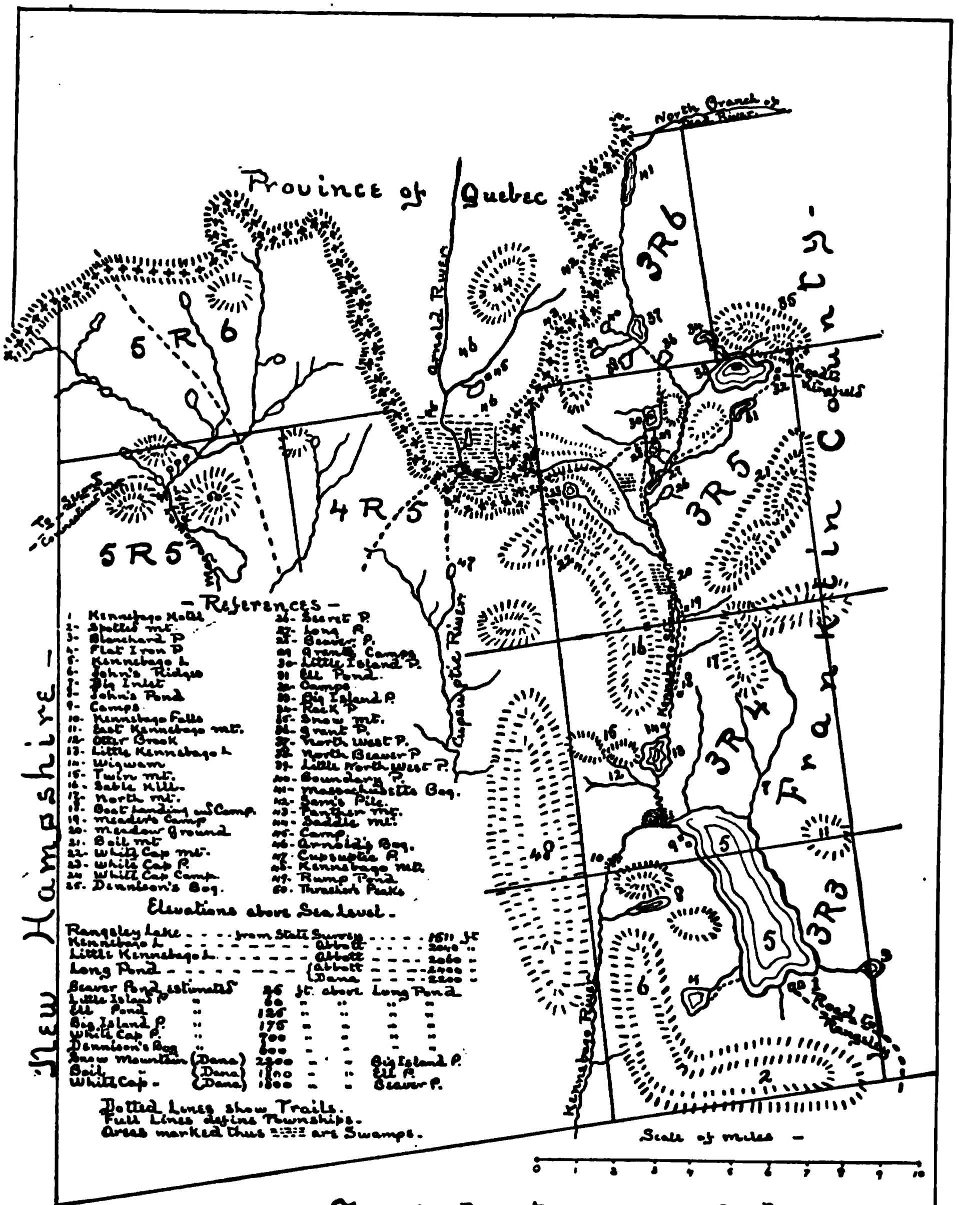
We pass the night at the hostelry above described, and the next morning board the little steamer that lies at the landing. Our guides are with us, and the boats are tied astern. It is quite practicable to make the journey down the lake in row-boats; but the steamer saves much time and trouble, especially in rough weather. Near the outlet there are two log camps, some distance apart, each buried in the wood. Here parties live as they please, within easy reach of fish and game; and life would be quite enjoyable if the wheezing steamer did not come down every day to dispel any illusion that all civilization had been left behind. Some distance from the foot of the lake the water grows shallow, and we board the boats to row up stream. Two in a boat constitute a load, but three can go well enough with fair water.

The start is made down the outlet; but we soon leave it and work our way through a cut-off channel, which about half a mile above diverts a part of the river and empties it into the very outlet of the lake. It may almost be said that it is inlet and outlet together; in flood water the statement would be strictly true. Rowing, paddling, and pushing, we squirm along the tortuous channel, which winds around in the alder-swamp as if it did not want to get through. Sometimes a blue heron starts up within a rod of us as we round a point, or a muskrat swims away to his hole. Here and there an old beaver-house remains as it was left when its occupants moved to less frequented waters above, or possibly were caught to deck a New York Christmas. We soon reach the main stream, up which we turn on our way to its farthest source. The alder-swamp has been left behind, and in its place the primeval forest is on either side: not the forest that surrounds Moosehead and Chesuncook; not the forest that lines the banks of the Kennebec, the Penobscot, and the St. John, styled primeval by every novice in woodcraft, — but really only a lot of hard-wood trees with a few firs left by the choppers as worthless. Here is a virgin, unmapped, untrodden wilderness which has never known the axe of the lumberman nor the ravages of fire, standing to-day as it has stood for centuries, with every pine-tree unharmed, and with the spruce and balsam masking the glare of the spectral birches; while on the ground the long straight billows mark where long years since the old men of the forest have fallen and been buried by the damp and shaggy moss in kindly sepulture. The paths of the deer come down to the shore between the trees, and every little patch of grass in the dead water of a bend shows where these wild cattle pastured the night before. At many a place where the banks are steep a slide made by muskrat or otter proves that tobogganning is not an invention of man.

Pushing up an unusually steep place, we pass the inlet of Otter Brook, and soon after reach the Little Kennebago Lake. It is a beautiful sheet of water, oval in shape, and about half a mile long, surrounded by high hills whose wild woods come down to the shore on every side, and then in their reflection keep on into the waters, as if they would occupy the very depths. Northward we paddle across amid the eternal silence. We seem to have broken into a secret fastness of the wilderness. One can imagine that Nature was playing some wild harmony, and stopped in fear when we entered.

Unwillingly we seek the hidden entrance to the pond, as perfectly concealed as though by high design, and follow the stream, guided by a pair of kingfishers, who fly ahead and light on every tree that overhangs the water, like many men whose business habits cling to them in idle hours.

Some two miles or more from the Little Kennebago is the head of practicable navigation, and we take to the woods on the right bank, tying the boats to the trees to stay until our return. A few yards from the shore is a new camp built by two guides who spent last winter here and had very fair luck in trapping muskrat, beaver, and sable. The Seven Ponds trail starts through a swamp, which is the worst place on the whole line. Beyond this we wind along within a short distance of the stream upon the left. The path is well marked, for in wet ground a little travel leaves an enduring impression. Throughout this region brooks and springs abound, and a canteen is a superfluity. After three or four miles we come to the half-way camp, — a well-built log-house which is seldom used. Near by could be seen, a few years since, the wreck of an old camp where, a score of years ago, a trapper named Meader made his winter home; and this spot still goes by the name of Meader's Camp. Half a mile beyond the path finds the water; we take boats here, and work up the river about a mile and a half. At the head of the still water



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by H H Campbell, Steelton, Pa.

The Headwaters of the Androscoggin.

North Western Maine –

we start on ground again, this time with the stream upon the right. We cross a brook that comes from White Cap Pond, and also the stream from Dennison's Bog. Once from the top of a little cliff the river comes in view as it widens into a pool.

After a walk of about two miles and a half we stand at the outlet of Beaver Pond. On the farther shore is a row of log-houses, which is the objective point of our expedition. After a little shouting, a boat comes to ferry us over. In it is Ed. Grant, the proprietor, — a bronzed, wiry man of middle age, whom every sportsman knows and remembers as a personal friend. Not quite the Leatherstocking of Cooper, he is nevertheless of his class. Did a limitless wilderness stretch outward from his domain, we can imagine him, like the hero of the "Pioneer," waving to us a good-by and disappearing forever in the shadow of the wood. Confined by the civilization of two empires, his fondest recollection is of that wild time, a quarter of a century ago, "when me and Meader trapped together up and down the stream." Within the last three years he has cleared a little knoll on the northern shore of Beaver Pond, and has now five log-camps. One is used by the guides, another as a dining-room; while the others are let to parties as apartments in a hotel. The camps are well built, having one room with an open fireplace. Sleeping accommodations are arranged according to the number of guests. The cook is a master; the food simple, but excellent.

A few yards in front of the camp, looking to the southward, lie the still waters of the pond, half covered with lily-pads, among which the trout are jumping. Down to the right among the trees stands a beaver-house. It had been deserted for some years; but last winter a family moved in and fixed it up a little. They patched the roof and cleared out the channels, and had hauled up three or four armfuls of alders for their winter's food, when Grant set his traps, and the history of the colony was closed. Many years ago the beavers scooped out a channel some four feet deep and two yards wide, running along close to the shore and connecting the two deep parts of the pond, so that they could find free communication in the coldest weather. The line of open water bounded by the lily-pads marks this excavation as clearly as though it were colored on a map.

Grant's Camps are situated nearly in the centre of Township III., Range V., in Franklin County, Maine. This township is leased one half by Grant and the other half by the Megantic Club. The two townships to the south — Township III., Range IV., and Township III., Range III., — are leased by the proprietors of the Kennebago Hotel. These and all the surrounding country are the property of persons and companies whose sole interest is the timber that stands ready for the axe. Heretofore the expense of getting it to market has prevented any move in that direction. The tedious hauling of the rafts across the big lakes, and the number of dams to traverse before reaching the lower Androscoggin, render it unprofitable to work anything but the best of timber on the Kennebago and Cupsuptic Rivers. The fall just below Kennebago Lake draws a line which profit has not yet crossed, while the long stretch of tortuous rocky rapids between the Little Kennebago and the Seven Ponds has put the upper area almost out of the question. A new factor, however, has entered the problem. Only a few years ago the railroad reached Phillips. This summer the engine will steam into Rangeley, and it will be but a few years before the landowners will project the track to the northward. Until that time comes, they are well satisfied if their property is protected from fire. They accordingly sell to responsible parties the right of occupation. The lease is but for a short time. The hotel proprietors at Kennebago and Grant at the Seven Ponds are really only tenants at will; but the nature of their business renders it to their interest to prohibit camping-parties, and these tenants may be looked upon as custodians of the forests, receiving their pay in a nominal rental.

Into this general category fall two fish and game clubs which have chartered great preserves near by. The territory of the Megantic Club embraces the headwaters of the Dead River, and extends over the border to Lake Megantic; the Parmachenee Club, as before stated, occupies the valleys of the Cupsuptic and the Magalloway. It is a cause for congratulation that the sentiment of the lessees and habitués of this great region has always been in favor of the protection of the game that swarms in its forests, although it is quite true that the letter of the law is not always followed in blind obedience.

Beaver Pond lies in a great amphitheatre. Near it are many ponds and brooks, most of which send their waters to swell the Kennebago stream. These ponds are easily accessible, and on all the larger ones there is a boat for the accommodation of fishermen. In addition to these attractions, three mountains rise invitingly around and form an encircling wall. Each of these can easily be ascended during a day, leaving the camp in the morning and returning in the afternoon. Snow Mountain is attacked from the northern shore of Big Island Pond, and a spotted line runs to the top. For the first half-mile it follows a brook, but after that no water is found during the trip. The path is very little travelled, and fallen trees are quite frequent. There is no serious obstacle, however, and the ascent can be made in an hour and a half. The top commands a view down the valley of the Dead River and across the border to Lake Megantic.

White Cap has a trail leading from White Cap Camp up the edge on the northwestern slope. It is unnecessary to follow the line, as the slope is very uniform. In the descent the steep eastern side will be found very easy. After reaching the lower slopes, the course should be turned to the left, so as to intercept the trail from Beaver to White Cap Camp, as otherwise a bad swamp will be encountered. This mountain gives an excellent view of the wild region of the ox-bow, where the only breaks in the forest are the flat meadow in Dennison's Bog and the fathomless quaking quagmire to which the great American traitor has given his name. It is more than a century since, a few miles to the north, the expedition against Quebec crossed, from the valley of the Dead River, over the border into this long morass that lines the banks of the Chaudière; but that spot man has left undisturbed, and the ghosts of the starved and frozen patriots who perished there have had only the deer and the beaver to keep them company in their hermitage.

Boil Mountain is the most attractive of all. There is no trail leading to the summit, and it is to be hoped it will thus remain. Moreover it affords the best view of the lake district. An ascent was made a few years ago from Ell Pond; but a great "blow-down" area was encountered, which made the task very difficult. The writer started from Long Pond at the inlet from Ell, made a straight line for the middle of the saddle, and followed the crest to the peak. This method can hardly be recommended. The ridge is covered with fallen trees, and between them, revelling in the admitted sunshine, the raspberry bushes are holding high carnival. A better way is the line taken in coming down. The inlet from Ell Pond should be ascended from Long Pond for about a quarter of a mile, and then a straight course taken for the peak. This diagonal avoids the bad places, and also crosses one or two little brooks, — a consideration not without value.

Beside the ponds and mountains the true lover of Nature can find abundant field of enjoyment in following the streams that run from pond to pond, or in wandering through the wilderness. Indians have hunted the deer and the caribou for centuries; trappers have travelled the watercourses, and now and then have chased a moose over the ridges; sportsmen have worn the narrow trails between a few favored spots, and restless nemophilists have wandered here and there outside the beaten paths; but it is more than probable that in erratic tramps over hill and valley great areas will be traversed where the foot of man has never trod. Certain it is no record has been left behind. The tree-trunks have rotted where they fell, and the unbroken fragile shells enclosed in velvet mausoleums are evidence enough that the sanctuary has been undisturbed since the hunters of Oquossoc speared the trout in the waters of the Kennebago.

In the near future all this will be changed. It is true that the rigorous climate, with its frosts in June and snows in September, will prevent the permanent settlement of the valley; but the lumberman and the tourist are not governed by such considerations. The day is coming when the locomotive will break the silence of the southern pass, and the glory of the Seven Ponds will be a legend of a time gone by.

Some Adirondack Paths.

Third Paper.[1]

By Frank W. Freeborn.

Read January 14, 1891.

To Mt. Marcy via John's Brook.

To the visitor to Keene Valley the cone of Marcy appears, just before he reaches the village, rising at the head of the forest-covered valley of John's Brook. To reach it by way of this valley seems therefore the most direct course. But though much shorter than the ordinary route over the Ausable Lakes, it is more difficult, requires nearly twice as long a tramp with pack on back, and affords much less picturesque scenery. For these reasons it is seldom used. There was said to be an old trail there, but so blind as to be useless. Many diverging trails marked by fishermen and exploring parties led into *culs-de-sac;* so that any one who should try to reach Tahawus by that route without a guide was likely to lose his time and labor. In the summers of '89 and '90, however, the route had been travelled by two or three parties who were said to have corrected the tree-markings. I arranged with a guide to take two of us through these woods, going up by way of the Ausable Lakes and coming down through the valley. My associate was a bright, companionable school-boy.

Our path up has been described in Appalachia, vol. vi. p. 55. Between the season of '89 and '90 the Adirondack Mountain Reserve had cleared out the path and built a new camp higher up than Bowlder Camp. On our way up we turned aside to revisit the latter. It was more ruinous than ever. The side-wall of logs had fallen, and the bark roof was going to pieces. By another year it will be uninhabitable.

The new camp stands on the right of the trail about 15 minutes higher up, with a little streamlet close in front and Skylight Brook a few rods behind it. It is built of heavy timber, with a roof of hollowed logs, and will hold eight persons comfortably. Some of the first occupants gave it the sentimental name of Camp Hope; but the guides, with more regard to a descriptive appellation, call it Smoky City.

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[1] See Appalachia, vol. v. p. 222, and vol. vi. p. 51.

We stayed here two nights and a day, storm-bound. When we left, the clouds were still thick and a gentle rain was falling now and then. The trail here is always wet as far as the ledges. On that day it was at its worst. Above the tree-line the wind was violent and benumbing. We reached the summit of Marcy nearly at nine o'clock; but as the hoped-for signs of clearing did not appear, we did not stop longer than to replace the damaged Appalachian cylinder by a new one. The old one was put there in '88. From the records left there I find that the average time required by 20 parties to ascend from Cold Slough was 3 hours 15 minutes; by 11 parties from Adirondack Lodge, 3 hours 20 minutes. I am satisfied that the distance from Cold Slough, generally called 7 miles, cannot measure over 5½ miles, and I should not be surprised if 5 miles were nearer the true distance.

In descending to hunt for the new John's Brook trail, we followed at first the Van Hoevenburgh trail toward Adirondack Lodge. It crosses the ledges, marked by a very few cairns, in a northerly direction, and just after entering the scrub it passes through two boggy hollows much more disagreeable to traverse than any part of the trail on the southern side. In 30 minutes after leaving the summit, just where the path begins to rise a little to cross Table Top Ridge, we left the trail close by a small silver-birch broken off. We turned sharply to the right, and after hunting about to the eastward for 10 or 15 minutes we found newly spotted trees. It was easy now to follow this line; and a pretty rapid descent through fairly open timber brought us in 1 hour 15 minutes from the Van Hoevenburgh trail to Slant-Rock Camp. This shelter is made by building an angle of logs about breast-high against a very large overhanging bowlder, and gives, by close stowing, sleeping-room for four or five persons. It lies a little higher than Bowlder Camp, and is the most convenient rendezvous for parties from Keene Valley visiting Marcy by this route. With a fire and lunch we passed an hour here.

Just behind the camp we came for the first time that day upon John's Brook, which is joined here by a nameless streamlet of about equal volume coming from the same direction as ourselves. Still following the new trail, we crossed John's Brook and recrossed it twice more within ten minutes. Our course then lay on the right of the stream at some distance from it, and brought us in 50 minutes from Slant Rock to the junction of Twin Brook and John's Brook. We crossed them both, and for the rest of the day remained on the left bank of the latter, though generally out of sight and sound of it. About 15 minutes after crossing, the heavy roaring of the stream in its deep gorge attracted our attention, and climbing down a steep side ravine, we came to the foot of Bushnell Falls. It is about 60 feet high, and in form and situation much resembles Glen Ellis Falls in the White Mountains.

Resuming the path which for the rest of the way was in open timber and of moderate slope, we crossed Bear Brook, and reached a small camp near John's Brook in 50 minutes from Bushnell Falls. This camp, a fisherman's resort, lies on the southern edge of a burned clearing of several acres near the mouth of Ore Bed Brook, which drains the sides of the Gothics and Saddleback. Just above the junction John's Brook flows through a deep gorge well worth the attention of any one making the tour of this valley in good weather.

The light rain had begun to fall again, and we lost some time hunting for the continuation of the trail near the river. We found that we had missed it just after crossing Bear Brook, and that instead of passing near the camp it skirts the upper edge of the clearing. It had been represented to us that the John's Brook route gave no view of the mountains; but this clearing must show some of them, as it is very large and is itself plainly visible from the top of the Gothics.

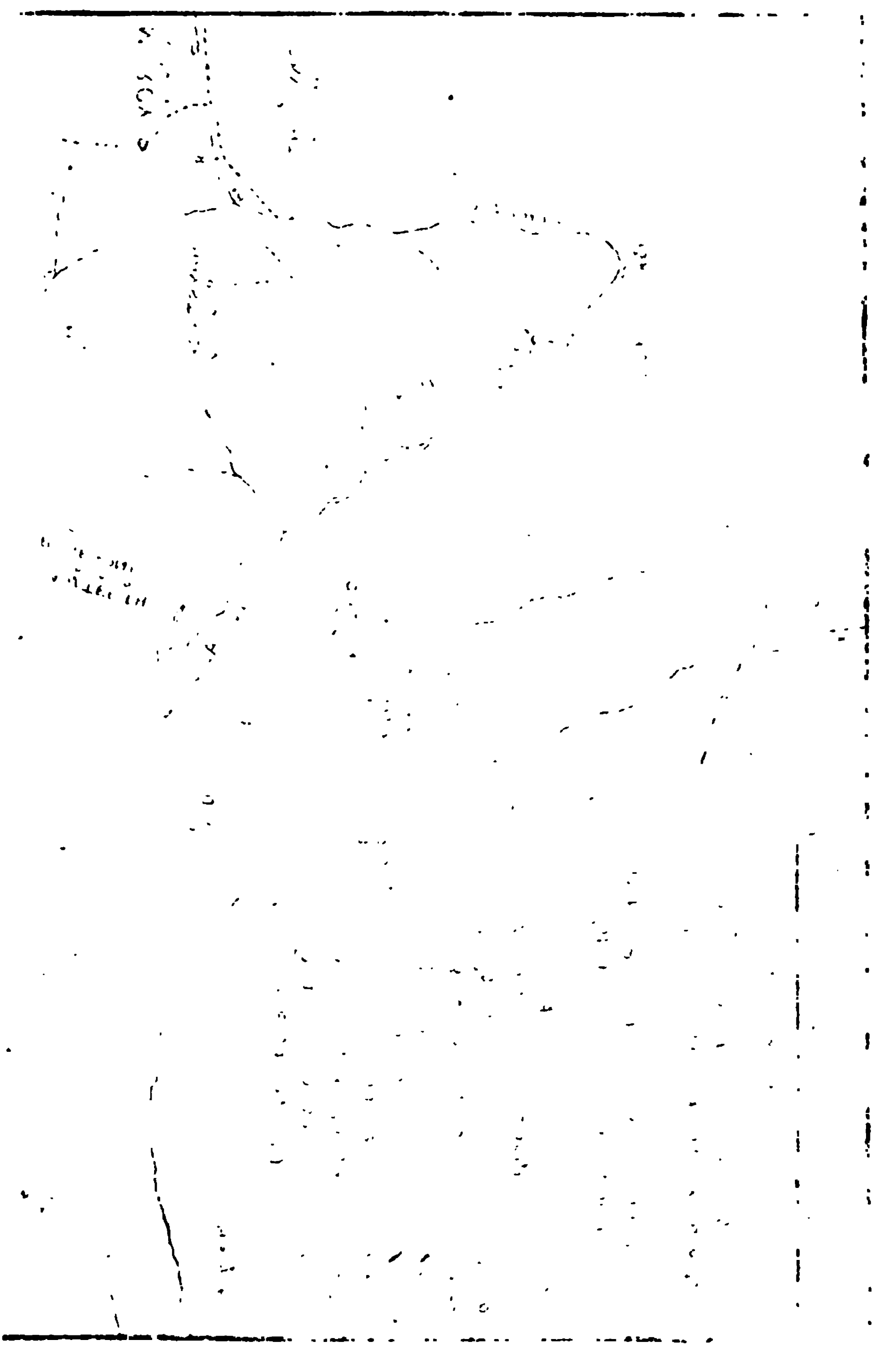
In 50 minutes from Bear Brook we crossed Deer Brook, and in 35 minutes more we emerged from the woods upon the cleared plateau by the Mt. Porter House, a mile from Keene Valley. Our time from the summit of Tahawus to the village, exclusive of long stops, was 5 hours 45 minutes. The distance is about 11 miles.

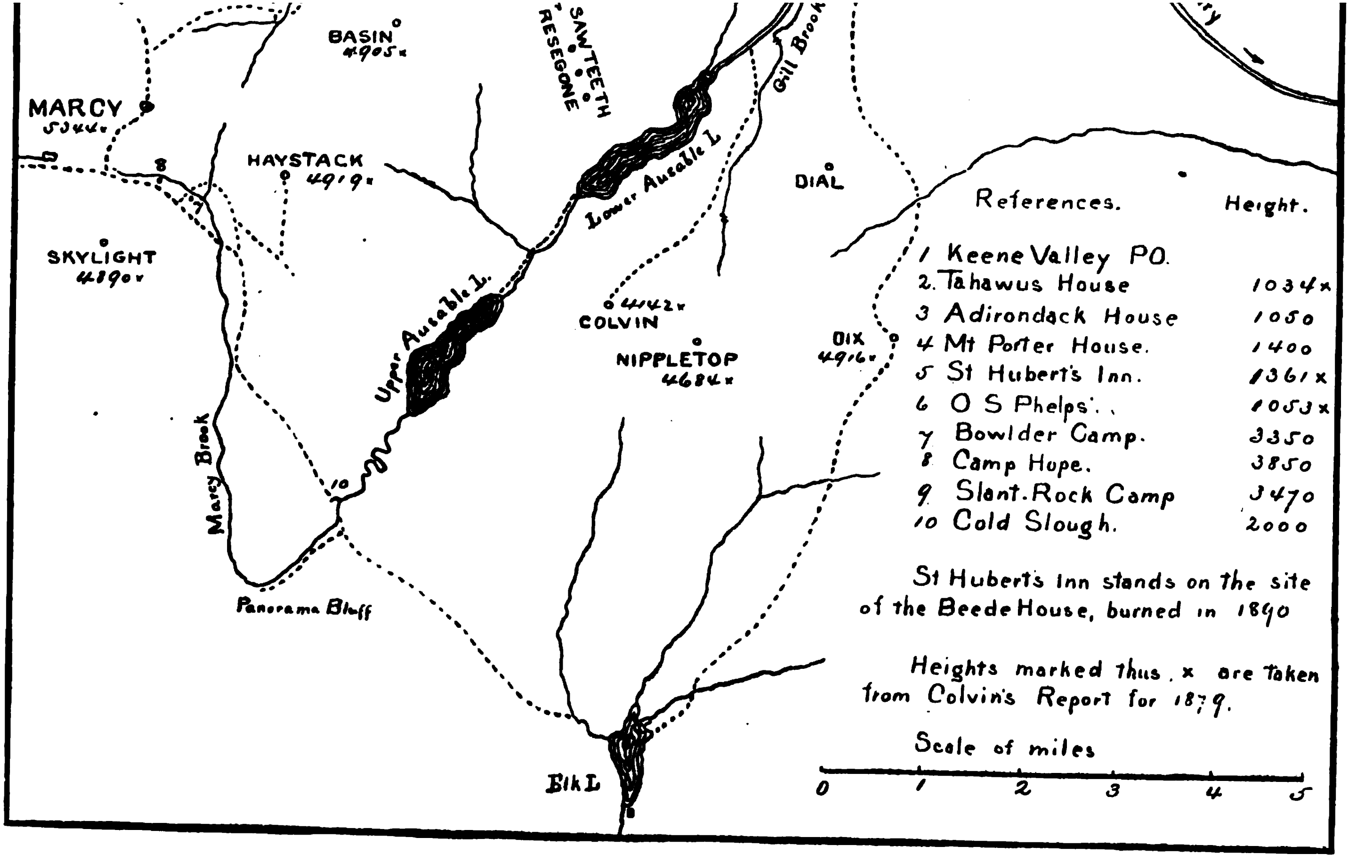
PANORAMA BLUFF.

This point, though accessible without any climbing, gives such a comprehensive view of the Marcy group of mountains, that it deserves notice in connection with thėm. Comparatively few people go there, and yet it is easily visited in connection with a day's trip to the Ausable Lakes or by a little detour on the way to Marcy. To reach it we row up the inlet of the Upper Ausable about 30 minutes. A short distance beyond Cold Slough, we land at the Elk Lake trail at the end of boating on the stream. A walk of 20 minutes in the same general direction, avoiding all trails diverging to the left, brings us to the bluff on the bank of the same stream and elevated only about 20 feet above it. Over the broad hackmatack swamp to the northward appears the best panorama of the mountains to be had from the south. It is the first point we have reached, since leaving Keene Valley, from which Marcy can be seen. The position of the various peaks emphasizes their relative height and bulk. They take their natural order from west to east as follows: Allen, Skylight, round and bare; Marcy, from top to bottom at the head of the valley opening toward us; Haystack, rising from the retreating ridge of Bartlett, Basin, Saddleback, the Gothics, and Resegone. Any one intending to study these mountains would do well to get this view as a preliminary survey.

In my two previous papers on Adirondack Paths, springs or small pools were noted on or near the summits of Porter, Giant, Hopkins, Gothic, and Noonmark. All these are quite dry at the end of such a drought as that of last summer, and climbers who wish water at the top of these mountains must carry it from the brooks below. Marcy is the only mountain that has a perennial spring near the top.

In regard to paths described, a few changes are to be noted. That to Noonmark is now intersected at its lower end by a short wagon-road leading from the main road to a new house just within the woods. That to the Giant divides about 50 minutes after leaving the brookside, the right fork being a new trail of easier grade than the old and uniting with it at

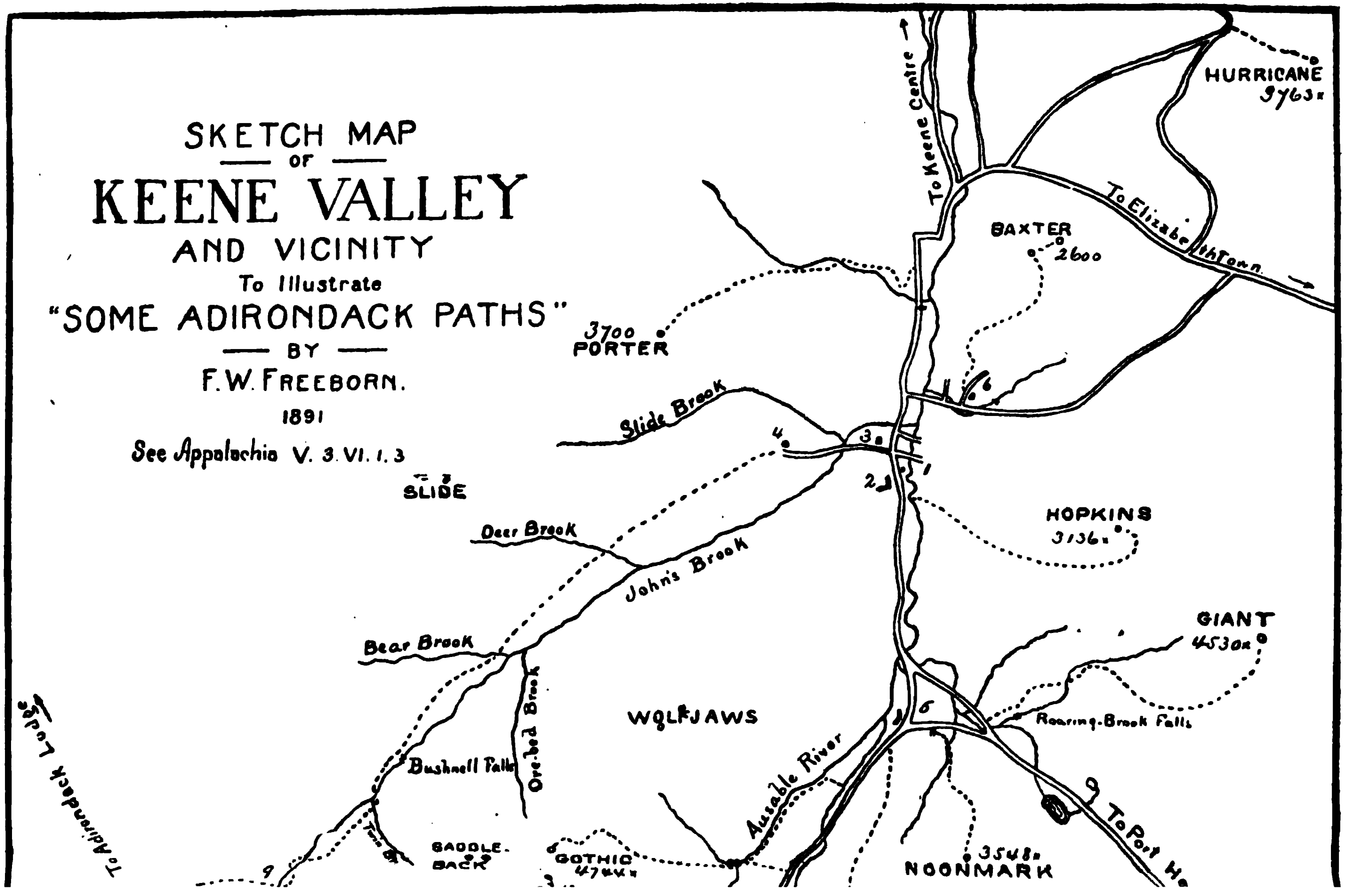




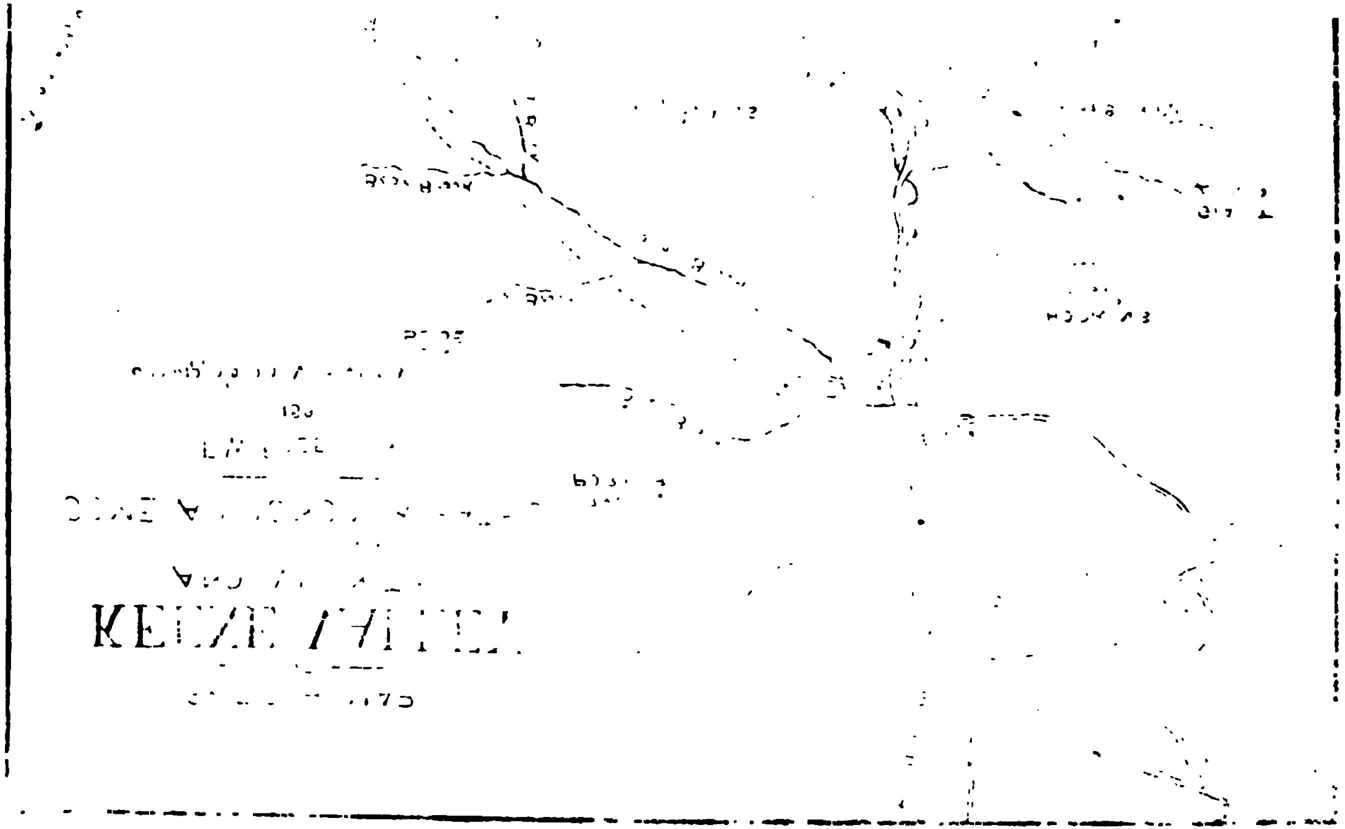
References.	Height.
1 Keene Valley PO.	
2. Tahawus House	1034x
3 Adirondack House	1050
4 Mt Porter House.	1400
5 St Hubert's Inn.	1361x
6 O S Phelps'.	1053x
7 Bowlder Camp.	3350
8 Camp Hope.	3850
9 Slant. Rock Camp	3470
10 Cold Slough.	2000

St Hubert's Inn stands on the site of the Beede House, burned in 1890

Heights marked thus, x are taken from Colvin's Report for 1879.



SKETCH MAP
OF
KEENE VALLEY
AND VICINITY
To Illustrate
"SOME ADIRONDACK PATHS"
BY
F. W. FREEBORN.
1891
See Appalachia V. 3 VI. 1. 3



the top of the ridge. The milking-yard mentioned in connection with this trail is now an open lot. The large hemlock marking the junction of the two lumber-roads has disappeared; persons inadvertently passing this junction would come in two or three minutes to a pretty sluice and fall in the brook on the right. The trail to the Gothics leaves the road at the two-mile tree.

In preparing the accompanying map I located the summits of the mountains and some other important points by many observations with pocket compass. Distances on roads and trails I determined by pedometer, making such allowances and corrections as a careful study of the instrument required. Absolute accuracy either in position or distance is not guaranteed, though it will be found near enough for all practical purposes. Heights marked with a cross are taken from Colvin's Report for 1879; and some discrepancies which may be noted between those given on the map and those given in APPALACHIA, Vol. V., may be accounted for by the fact that the latter were taken from an earlier report, and were presumably less correct. All other heights are either derived from Mr. Colvin, or are the result of my own observations of an aneroid barometer, compared and corrected for local and temporary perturbations.

The Geographical Exhibition.

By W. M. Davis.

During three weeks in May, 1891, a free public exhibition was made in Boston of the collection of geographical appliances owned by the Brooklyn Institute of Arts and Sciences, under the auspices of our Club, the importance and success of which warrant the publication of an account of the undertaking in APPALACHIA.

The collection was made last year by the Brooklyn Institute, — an incorporated association of some seventy years' standing, founded by Augustus Graham, and in late years awakened to increased activity. It is somewhat similar to the Franklin Institute of Philadelphia, in having series of lectures of general interest in connection with its library and collections of various kinds. At present it is divided into many departments, each of which is managed by a committee, under the general control of a board of directors. The department of geography undertook the formation of a collection of geographical appliances used in schools and colleges, and to this end sent out circulars to publishers in this country and Europe, asking for the gift of anything issued in this line. The response was remarkably generous, and very encouraging to the department. A large room was engaged for the month of March in the Brooklyn Arcade, on Fulton Street, Brooklyn; and although the collection was somewhat cramped for space there, the exhibition was largely attended, and excited much interest. I visited it there, and learned from Mr. C. C. Adams, chairman of the department, under what conditions it might be brought to Boston: if a room of sufficient size and a fund for expenses could be provided, the departmental officers would see to all details of transportation, arrangement, supervision, and clearing away. It was suggested to the Appalachian Mountain Club that such an exhibition might well be made under their auspices; and at the request of the President I attended a meeting of the Council to explain the affair, and urge some of the more active members of the Club to look after it. My representations must have been more fervid than I intended, for before it could be prevented, a committee, consisting of Messrs. Curtis, Niles, Fay, and Eliot, was appointed, and I was made chairman, all protests to the contrary notwithstanding.

After some search for a satisfactory room for the collection, it was decided to engage the Winslow Skating Rink for three weeks in May; and although only a beginning of the funds necessary had then been subscribed, we proceeded at once to make formal arrangements with the Brooklyn Institute, trusting in our ability to raise the money needed before it would be called for. A circular, setting forth the project, was prepared and sent to a number of persons likely to be interested in such an exhibition; in this way a number of influential names were secured, endorsing the undertaking; and with these we appeared before the public.

The ease with which the needed fund was raised on this appeal was most encouraging. The Woman's Educational Association voted $100, the Council of our Club did the same; and among the personal contributors should be mentioned Mrs. Henry L. Higginson, who sent us a similar amount from herself and her friends.

Thus secure in meeting our expenses, we next turned attention to spreading the news of the exhibition. The newspapers gave us paragraphs as often as asked, and, indeed, were most attentive to our needs during the whole course of the exhibition. The Boston School Board — chiefly, I think, through the recommendation of Mr. S. B. Capen, Chairman of the Committee on Manual Training — sent special circulars announcing the exhibition to all the public schools in Boston. Our own circulars were sent to all the private schools and to the school superintendents in all the cities and towns near Boston, and to all members of the Club. If we had had longer time of preparation, and if the committee could have devoted more time to the work, we should have probably had a tempting card displayed in the street cars, and it is likely that such an announcement would have doubled the attendance at the exhibition. It is, indeed, unfortunate that this was not done; and the next time the Club fathers an exhibition, a chairman should be appointed in charge of it who will not overlook so important a means of notifying the public.

The exhibition was opened on Monday, May 11. The use of the rink was allowed on the preceding days, and by great exertions on the part of Mr. Adams and Mr. Kemp and their assistant, Mr. J. C. Davis, who represented the Brooklyn Institute, the arrangement of the maps and other materials was nearly completed at the time of opening. We had supposed that the large floor space of the rink would be left somewhat empty, and feared that it might look bare; but in this we were most agreeably disappointed. It was entirely filled, even to overflowing on racks around the railing. With abundant space, plentiful light, and free air, the impression excited was extremely pleasant. I do not think that a single visitor failed to be impressed with the extent of the collection. Every one with whom I spoke was surprised at the number and variety of the exhibits.

For the first few days the attendance was small. I presume that the time of year, when all the schools were busy with approaching examinations, and the position of the exhibition away from crowded thoroughfares, both conspired to diminish the number of visitors; but every one who came sent us many others to follow. The attendance grew from day to day, and on several occasions in the second and third weeks of the exhibition it was fairly thronged with visitors of a very intelligent quality. It was, perhaps, on the whole an advantage to be somewhat at one side of the city, as for this reason there were few persons in the rink by accident; every one who came had an object in coming. Although open freely to the public, there was no disorder of any kind, except for occasional outbreaks of exuberant school-children. Mr. Kemp, who was in attendance during the whole time of exhibition, estimates the total attendance above ten or twelve thousand persons.

A large number of those who came were teachers or scholars, or in some way connected with our schools or colleges. These visitors manifested a high degree of intelligent interest in the collection, and certainly appeared to enjoy and profit from it. Mr. Kemp noted representatives of schools from Winchendon, Worcester, Framingham, Fall River, South Natick, Providence, Bridgewater, Plymouth, Lynn, Salem, Malden, and Winthrop. Besides these, the teachers of Cambridge, Newton, Somerville, Revere, Roxbury, Charlestown, and certain other places, attended the exhibition in large parties, special action having been taken by the school boards in some cases for this purpose. Classes from public and private schools in Boston were present almost daily.

With such an attendance as this, we have to regret that it was not possible to carry out a plan proposed by several persons interested in our success; namely, to give explanatory lectures at certain hours. This would have greatly increased the profit of the exhibition, but it was not within the power of the committee to undertake so serious a labor. Mr. Kemp, however, representing the Brooklyn Institute, was present at all times, and was untiring in his efforts to answer all questions. Even without formal explanations, it is evident that much information of a kind valuable to our schools was widely spread. Our Massachusetts State map, for example, was exhibited, as a loan from Professor N. S. Shaler, one of the map commissioners; the quality of the map and the low price at which it can be obtained thus became known to many who had never heard of it before. Several large atlases of the topographic sheets prepared by the United States Geological Survey were open to inspection on one of the tables. The four-sheet map of Rhode Island, on a scale of an inch to a mile, with twenty-foot contours, was given a special rack, as far as prepared at the time of the exhibition. Of foreign maps, chiefly for school use, the variety was surprising and the excellence enviable. Those published for the School Commissioners of Zurich, Switzerland, were particularly noticeable for the clearness with which they exhibited the form of the country. Charts of the world in every form, and maps of the larger countries in great variety, afforded the inquiring teacher the best means of selecting those which his school needed, thus giving him something definite with which to attack his superintendent and school board. In the same way text-books innumerable, from the most elementary to the most advanced, were spread out on large tables, where all could be examined at leisure. Here it was often a pleasure to see the visitor begin a hasty inspection, then slacken his pace on finding something suited to his needs, and finally draw up a chair and sit down before the table for a deliberate study of the books, often note-book in hand. Some teachers who were going abroad for the summer thus informed themselves of what they should best bring back with them.

Through the activity of Professor Fay, our own Club's work was fully represented. All our publications in books and maps were placed on a special table and rack; with these came contributions from our library, chiefly of Alpine periodicals. Close at hand was a series of geographical periodicals, mostly loaned from the Harvard College Library. Professor Fay also secured three notable series of mountain photographs:

those by Donkin in the Alps, by Sella in the Caucasus, and by Chapin in the Rocky Mountains. The models belonging to the collection were supplemented by a number of others loaned from the Physical Geography Laboratory of Harvard College, and including the beautiful reliefs by Heim of Zurich, the finest of their kind that I have seen. All of these maps, books, models, views, atlases, and globes were listed in a catalogue, with a supplement for the articles loaned for the Boston exhibition; this catalogue forms a very serviceable guide to the geographical appliances of our time. Those who made notes of what they saw, catalogue in hand, will retain a record that must be of much service.

Before the close of the exhibition it was photographed from the gallery, and several different views were obtained. Copies of these may now be ordered by members, if desired.

At the close of the exhibition, it was found that the sum of $884 had been subscribed for the use of the Committee toward the expenses of the undertaking. Of this $450 went for rent of the rink, with an extra $21 for electric lights during three evenings, and the sum of $301.50 was handed to the Brooklyn Institute, — this sum, together with what was received for advertisements in their catalogue, sufficing to cover their considerable expenses. The balance of the fund went to defray the expenses incurred by the Committee.

In concluding my account of the exhibition, which may be taken as a kind of report to the Club on a piece of work done in its name, I append a statement received from the Department of Geography of the Brooklyn Institute, from which it appears that not only those who saw the exhibition, but those who originated it as well, were satisfied with its appearance and its effects in Boston.

BROOKLYN, N. Y., July 1, 1891.

TO PROF. WILLIAM M. DAVIS, PROF. W. H. NILES, PROF. C. E. FAY, PRES. R. F. CURTIS, AND CHARLES ELIOT, ESQ., COMMITTEE OF THE APPALACHIAN MOUNTAIN CLUB.

GENTLEMEN, — We wish sincerely to thank your Committee for your invaluable co-operation, which assured the conspicuous success of the Geographical Exhibition of the Brooklyn Institute in Boston. Our Committee undertook the collection of this material in the hope and belief that the Exhibition we proposed would tend to stimulate public interest in geography, to familiarize our people with the best geographical appliances, and to raise the standards of geographical education. The work you accomplished in behalf of the Exhibition in Boston, and the wide interest in the enterprise, particularly among educators, which was stimulated by your energy and enthusiasm, are to us conclusive proofs that the collection is well adapted to serve the purposes for which it was made.

The Appalachian Mountain Club, through its Committee, assumed the entire financial responsibility for the Boston Exhibition, and called public attention to it so successfully that excursions from fifty miles around and many visitors from other New England States were among the fifteen thousand people who studied the collection. You provided a hall in which all our material could be shown to the very best advantage. You added many exhibits which admirably supplemented our collection and enhanced its educational value. We had the most encouraging and conclusive evidence, while the Exhibition was in progress, that many teachers and others were making a helpful use of it. It is certainly a step in the right direction, that many New England schools will next fall place before their pupils some of the best maps and other geographical material that are made; and no more potent influence can be exerted to secure the improvement of our own school wall-maps and atlas-sheets than to familiarize our students with the best of this material.

We have reason to believe the Boston Exhibition will have lasting and important results, and we congratulate ourselves as well as you that your untiring efforts in its behalf met with such gratifying success.

Very truly yours,
[Signed] CYRUS C. ADAMS, *Chairman*
(and others).

Judge Pitman.

By Rev. Henry G. Spaulding.

The Hon. Robert Carter Pitman, who for the year 1889 was President of the Appalachian Mountain Club, died in Newton March 5, 1891. It seems fitting that some memorial of this distinguished citizen and eminent jurist should be given to the readers of Appalachia.

The incidents in the outward life of Judge Pitman are soon told. He was born in Newport, R. I., March 16, 1825. When a mere child he removed with his father to the city of New Bedford, Mass., which was his place of residence until he came to the city of Newton in 1876.

As a youth he studied at the Friends' Academy, and later he entered the Wesleyan University at Middletown, Conn. While in the regular studies of the College he occupied a medium place, he was pre-eminent in the breadth and depth of his reading and his ability in composition and debate. After his graduation in 1841 he studied law in the office of Thomas D. Eliot. He then spent a year in Louisiana as a tutor. It was no doubt owing to this residence in the South that he became so early an earnest opponent of slavery, and that he cast his lot with the party which aimed at its abolition.

After his return from Louisiana he resumed the study of the law, and in 1848 was admitted to the bar. From 1858 to 1864 he was judge of the police court of New Bedford. In 1858 he was chosen as representative to the General Court. In 1864 he was chosen for the first time to the Senate of Massachusetts, and again in 1868. On his re-election in the following year he was chosen to preside over that distinguished body, — a duty which he is said to have performed with remarkable ability. In 1869 he was appointed as Judge in the Superior Court by Gov. William Claflin, and this place he filled with credit and honor to the end. During these years he was an unswerving and uncompromising advocate of the prohibition of the liquor traffic, and often spoke and wrote with great power on this subject. One of his books, "Alcohol and the State," has become a classic in the temperance literature of this country. On two occasions he was the candidate for Governor on this issue, and at one of these contests he received the largest vote ever polled in this Commonwealth by a prohibition candidate. He was also greatly interested in the question of suffrage for women; and his article in the "North American Review" on that subject which appeared a few years ago was universally allowed to be the ablest presentation of the subject which has been made.

In 1855 Judge Pitman was married to Miss Frances Thomas, of New Bedford. Three sons were born to them. The oldest of these, who was a boy of great promise, died just before the family removed to Newton, while the other two still survive. Mrs. Pitman, who had been an invalid for many years, passed away shortly after her husband's death.

This outline of varied activities and useful services is but a hint of what Judge Pitman was and what he did. So far from being a "man of one idea," as he was sometimes regarded by those who knew him only as a reformer, he was one who could boast not "two soul-sides" only, but many sides of both soul and mind. He was a man who was always and in every relation of life true to principle, honorable, upright, just. But he was also the cheerful friend and companion, the helpful neighbor, the active worker in the church, the lover and student of good literature. All who came within the sphere of his immediate influence recognized their indebtedness to Judge Pitman for the aid he gave them toward the widening of their intellectual sympathies and the strengthening of those moral and spiritual convictions which are "the light of all our seeing." In the city of Newton, where he resided for the last fifteen years of his life, he founded the well-known "Tuesday Club;" and the papers which he read at its meetings were the ripe products of his extensive reading and profound thinking. These papers were always upon some high theme of literature or of life. His favorite study was English poetry. The writings of Mrs. Browning, Wordsworth, Lowell, and Robert Browning he had read once and again, and had made their thoughts part of his own intellectual being. In his later years he was not only an earnest student and ardent though discriminating admirer of the poetry of Robert Browning, but he also illustrated in his own life the beauty and the power which came to him from this poet's ethical and spiritual teachings.

His intimate acquaintance with Wordsworth's poems may have been one influence among others that made Judge Pitman a lover of Nature, —

> " Of the meadows and the woods
> And mountains, and of all that we behold
> From this green earth."

The writer of this article well remembers his first meeting with the Judge many years ago, in a summer vacation spent at Gorham, N. H. Such unaffected enthusiasm for the varied beauty of our White Mountain scenery as this distinguished jurist showed seemed then an unusual quality in a member of the legal profession. Yet neither then nor in his later years did Judge Pitman have the interest in Nature which comes from devotion to physical science, or the passionate love of her visible forms which such poetry as that of Wordsworth stimulates in responsive minds. The *solitudes* of Nature had no attraction for one whose supreme interest centred in the development of the soul. It was always pleasant for him to visit the mountains if he could be sure of finding congenial companionship. He loved the outward world because it was God's world; but the revelation of divinity came to him chiefly through what was noblest and grandest in human life. Being a man of his century, it was impossible that Judge Pitman should not share that sentiment of Nature which is an essential trait of the modern mind. But he dwelt too much in the realm of moral ideals, and was too deeply touched by " the still, sad music of humanity " to join the company of those who are ardent worshippers at the shrine of Nature's beauty.

The one great lesson his life may teach us all has been well expressed in a single sentence of the eloquent address delivered at his funeral by his pastor, Rev. F. B. Hornbrooke: "The only true life of a man consists in its growth, and in its ever increasing power to enter into loving sympathy with all the movements of the human spirit."

Report of the Recording Secretary for 1890.

On Jan. 1, 1891, the corporate membership of the Club was 731; the losses amounting to 93, the new members numbering 93, and two past members having been reinstated, the net gain for the year was two. The Life Members number 50; the Honorary Members 13, the same as last year; and the Corresponding Members 44, Señor Antonio Raimondi having deceased. The total membership, Jan. 1, 1891, was 788, an increase of one.

There were held during the year nine regular meetings, one special and one field meeting, the average attendance being 95. There were presented at these meetings eleven reports and eighteen papers. The White Mountains led with four communications; Maine, Colorado, and Switzerland had two each; and Massachusetts, Connecticut, Pennsylvania, North Carolina, Minnesota, Canada, Alaska, and Japan were also represented. One paper was general in its character, and four were illustrated with the lantern.

A successful field-meeting was held at North Woodstock, N. H., July 1–8, followed by an excursion to Randolph and three camping parties in the Madison Spring Hut. For the other excursions and the outings, reference is made to the report of the Excursion Committee.

The Snow-shoe Section has had several meets during the past few weeks; and in March a party, including ladies, camped in the Madison Spring Hut and climbed Mt. Adams.

The Section for Field Study continued its work, and now has 96 members. There were three field studies, — May 3, Kettle Hole at Dedham; May 31, at the Arnold Arboretum; October 11, at Bartholomew's Pond.

The annual social meeting was held at the Hotel Vendome, Friday evening, February 7. The attendance was 186. A very fine collection of photographs was on exhibition.

Nos. 1 and 2 of APPALACHIA, Vol. VI., were issued in May and December. "A Map of the Country about Boston" was issued early in the year, and has had a large sale.

For work in the different departments, reference is made to the reports of the Councillors.

Respectfully submitted,
ROSEWELL B. LAWRENCE.
Recording Secretary.

Report of the Corresponding Secretary for 1890.

THE duties of the Corresponding Secretary require him to attend to the correspondence with associated organizations and with individuals outside the Club, and to care for the library. The greater part of his report appears in tabulated form as a List of Corresponding Societies in the Register, and as a detailed statement, in an appendix to this report, of Accessions to the Library for the year.

All communications received are filed in a letter-book at the Club-room, open at all times to the inspection of members.

We have received the usual number of invitations to the annual or other gatherings of European clubs. Mr. A. Lawrence Rotch, appointed by the Council a delegate to any of these which he might be able to attend, represented this Club at the inauguration of M. L. Vallot's observatory near the summit of Mont Blanc.

The Club Alpine Belge asked for our co-operation in the preparation by them of a most valuable work, an Index to the periodical literature of the principal Alpine Clubs of the world.

Four additions have been made to the list of our Corresponding Societies, — the New Hampshire State Library, the

Geological Survey of Missouri, the Société des Touristes du Dauphiné, and the Oregon Alpine Club. The latter, organized in 1887 and reorganized in 1889, has not yet begun to issue any regular publications; but its position promises abundant growth of membership and valuable additions to our knowledge of the grand mountains of the Pacific coast. The Bonn section of the Deutscher und Österreichischer Alpenverein has been dropped from our list of exchanges. The number of societies with which we now hold relations of exchange is 70, of which 21 are in the United States, 11 in France, 10 in Austria, 6 in Italy, 5 in Germany, 2 each in Great Britain, Belgium, Switzerland, and Spain, and 1 each in Portugal, Holland, Sweden, Norway, Russia, Japan, Egypt, the West Indies, and Canada. The Club is to be congratulated on being already in correspondence with all the largest Alpine Clubs and the most important Geographical Societies of the world. No advantageous extension of the list seems at present practicable.

The library now contains 569 bound volumes and 1,050 unbound periodicals and pamphlets. Forty-one volumes have been bound during the year; and 10 cases, made to imitate the corresponding bound books, have been added to hold current numbers of important magazines. Of the books and periodicals added, 405 have come from exchanges, 33 were gifts, and 58 were purchased. We have received 92 maps, of which all but two have come from the United States Geological Survey. The series covering our own State is now complete.

While the Club owns nearly all the books which have appeared in regard to our New England mountains, there are some, now out of print, which it would be desirable to possess, but which cannot be had except when some chance brings them into the market. Members or friends of the Club owning such books and desiring to bestow them where they would be used by a large and appreciative circle of readers would find the Club a grateful recipient of them. The librarian is always glad to receive gifts or suggestions for the purchase of books, either old or new, which the Club should possess.

A list of accessions to the library for 1890 is appended to this report.

Respectfully submitted,

F. W. FREEBORN,
Corresponding Secretary.

ACCESSIONS TO THE LIBRARY FOR THE YEAR 1890.

FROM CORRESPONDING SOCIETIES.

American.

American Geographical Society. — Bulletin, Vol. XXI. 4 and Suppl.; XXII. 1-3.

American Museum of Natural History. — Annual Report for 1889-90; Bulletin, Vol. II. Nos. 3, 4; III. 1, and pp. 117-122.

California Academy of Sciences. — Proceedings, Vol. II.; Occasional Papers, I., II.

Cambridge Entomological Society. — Psyche, Vol. IV. 138-140; V. 160-177.

Essex Institute. — Bulletin, Vol. XXI. 7-12; XXII. 1-3.

Geological Survey of Missouri. — Bulletin, 1890, No. 1.

Geological and Natural History Survey of Canada. — Annual Report, Vol. III. and maps; Catalogue of Canadian Plants, Part 5; List of Canadian Hepaticæ.

Geological and Natural History Survey of Minnesota. — Annual Report, XVII.; Bulletin, 1, 5.

Minnesota Academy of Natural Sciences. — Bulletin, Vol. III. 1.

National Geographic Society. — Vol. II. 1-4.

New Hampshire State Library. — Report on State Line; Report of Forestry Commission of New Hampshire, 1885; One Hundredth Anniversary of the Constitution of the United States, Vols. I., II.

New York State Survey. — Report of Progress, 1888, 1889.

Philadelphia Academy of Natural Sciences. — Proceedings, 1889, Part 3; 1890, Part 1.

Smithsonian Institution. — Annual Report, 1886, Parts 1, 2; 1887, Parts 1, 2.

Torrey Botanical Club. — Bulletin, XVII. 1-8, 10-12.

United States War Department. — Annual Report of the Chief Signal Officer, 1889, Parts 1, 2; Geographical Report of the United States Geographical Surveys West of the 100th Meridian, Vol. I.

United States Geological Survey. — Mineral Resources of the United States, 1888. Bulletin, 54-61, 63, 64, 66; Annual Report, VIII., IX.; Monographs, I., XV., XVI.; 90 atlas sheets.

Foreign.

Associació d'Excursions Catalana. — Buttletí, Any XIII. 136-138.

Club Alpin Belge. — Bulletin, 1889, 13.

Club Alpin Français. — (*Direction Centrale*) Annuaire, 1889; Bulletin, 1889, 9; 1890, 1–8. (*Section des Alpes Maritimes*) Bulletin, X. (*Section de Saône-et-Loire*) Bulletin, 13. (*Section Lyonnaise*) Bulletin, VII. (*Section du Sud-Ouest*) Bulletin, 25–27.

Club Alpino Italiano. — (*Direzione Centrale*) Bollettino, XXIII. 56; Rivista, VIII. 8, 12; IX. 1–11. (*Sezione di Agordo*) Regolamenti. (*Sezione di Roma*) Guida al Gran Sasso d' Italia.

Club Alpin Suisse. — (*Comité Central*) Jahrbuch, XXV. Beilage zum Jahrbuch XXV.; Die ersten 25 Jahre des S. A. C. (*Section Genevoise*) L'Echo des Alpes, 1889, 4; 1890, 1–3.

Deutscher und Österreichischer Alpenverein. — Mittheilungen, 1889, 19, 20, 23, 24; 1890, 1–23.

Norske Turistforening. — Årbog, 1888, 1889.

Österreichischer Alpen-Club. — Österreichische Alpen-Zeitung, XI. 286; XII. 287–310.

Österreichischer Touristen-Club. — Österreichische Touristen-Zeitung, IX. 1, 16; X. 1, 2, 5–21.

Siebenbürgischer Karpathenverein. — Jahrbuch, X.

Società Alpina Friulana. — Cronaca bimestrale, I. 1–6.

Svenska Turistföreningen. — Årsskrift, 1890; Vårt Land.

Gesellschaft für Erdkunde (Berlin). — Verhandlungen, XVI. 9, 10; XVII. 1–5, 7.

Imp. Russkoye Geographitcheskoye Obshtchestvo. — Izviestiya, XXV. 4–7; XXVI. 1–4; Otchet, 1889.

Kais.-kön. naturhistorisches Hofmuseum (Vienna). — Annalen, Bd. IV. 4; V. 1–3.

Nederlandsch Aardrijkskundig Genootschap. — Tijdschrift, Ser. II. Deel. VI. Meer uitgebreede Artikelen 2; Deel. VII. 1–4.

Royal Geographical Society. — Proceedings, Vol. XII. 1–12.

Scottish Geographical Society. — Magazine, Vol. VI. 1–12.

Sociedad Geografica (Madrid). — Boletin, Tomo XXVII. 4–6 ; XXVIII. 4–6; XXIX. 1–4.

Sociedade de Geographia (Lisbon). — Boletim, 8ª Ser. 7–12; 9ª Ser. 1–6; L'Incident Anglo-Portugais; Importation abusive en Afrique par des Sujets Anglais d'Armes perfectionnées; Catalogos e indices as Publicações; Indices e catalogos a Bibliotheca.

Società Geografica Italiana. — Bollettino, Ser. III. Vol. II. 12; Vol. III. 1–11.

Société de Géographie Commerciale (Bordeaux). — Bulletin, 1889, 22–24; 1890, 1–19.

Société de Géographie Commerciale (Paris). — Bulletin, Tome XI. 1, 2 ; XII. 1–5.

Société de Géographie de Tours. — Revue, 1890, 1–7.

Société des Touristes du Dauphiné. — Annuaire, XIV., XV.

Société Royale de Géographie d'Anvers. — Bulletin, Tome XIV. 1–3; XV. 1.

Société Khédiviale de Géographie. — Bulletin, Ser. III. 2–4; Sommaire

Historique des Travaux Géographiques exécutés en Egypte sous la Dynastie de Mohammed Aly.

Teikoku Daigaku (Imperial University, Tokio). — Calendar for 1889-90; Journal of the College of Science, Vol. III. 3, 4.

Verein für Erdkunde (Leipsic). — Mittheilungen, 1889.

Verein für Erdkunde an der Universität Wien. — Bericht über das XV. Vereinsjahr.

OTHER EXCHANGES.

Revue Géographique Internationale, Vol. XIII. 154, 155; XIV. 164, 169, 170; XV. 171-179.

DONATIONS.[1]

Bulletin of New England Meteorological Society, Nos. 62-73.

Investigation of the Sea-Breeze. *W. M. Davis.* Gift of Author.

On some of the Larger Unexplored Regions of Canada. *G. M. Dawson.* Gift of *S. H. Scudder.*

Later Physiographical Geology of the Rocky Mountain Region in Canada, etc. *G. M. Dawson.* Gift of Author.

Glaciation of Northern Part of the Cordillera, etc. *G. M. Dawson.* Gift of Author.

Report of Exploration of the Glacial Lake Agassiz in Manitoba. *Warren Upham.* Gift of Author.

Identification of Francis Drake's Anchorage on Coast of California. *George Davidson.* Gift of Author.

The Discovery of the Ancient City of Norumbega. E. N. Horsford. Gift of Author.

The Problem of the Northmen. E. N. Horsford. Gift of Author.

Watertown: the Site of Norumbega. E. N. Horsford. Gift of Author.

A Review of the Natural History Society of Natick. Gift of Mr. Cheney.

Report on Public Records of Parishes, Towns, etc. C. D. Wright. Gift of R. T. Swan.

Arctic Explorations. E. K. Kane. 2 v. Gift of *Miss Kate Frazar.*

Compendium Tenth Census United States. Parts 1, 2. From the Department of the Interior.

APPALACHIA. — Vol. VI. 1, 2.

Register of the Appalachian Mountain Club, 1890.

Map of Country about Boston, with Town Lines. Gift of *E. G. Chamberlain.*

Map of the Country about Boston.

Map of New Hampshire. Gift of Mary L. Shepard.

The American Journal of Psychology, Vol. III. 3.

The Growth of a Tree from its Germ or Seed. O. S. Phelps. Gift of Author.

Statistical Annuary of the United States of Venezuela. 1889. Gift of A. P. Cushing.

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[1] Names of Club members are in italics.

Statistique de la Province de Buenos Aires. Annuaire, Année 8. Gift of A. Moutier.

Boletin del Inst. Geog. Argentino, 1889, X. 10-12.

Climbers' Guide to the Central Pennine Alps. W. M. Conway. Gift of Publisher.

Pictures of Nuremberg. H. J. Whitling. 2 v. Gift of *T. T. Woodruff.*

Expedition down the Begh-ula or Anderson River. R. Macfarlane.

Guida-Orario Ferrovia Santhià-Biella. Gift of *R. H. Budden.*

Sous Terre. (1889.) *E. A. Martel.* Gift of Author.

Sous Terre. (1890.) *E. A. Martel.* Gift of Author.

La Région des Causses. *E. A. Martel.* Gift of Author.

Les Cévennes. *E. A. Martel.* Gift of Author.

Illustrirter Führer durch die Dolomiten. Julius Meurer. Gift of A. Hartleben.

Illustrirter Führer durch Mittel-Italien. J. Oberosler. Gift of A. Hartleben.

Illustrirter Führer durch Saalfelden im Pinzgau und das Steinerne Meer. Gift of A. Hartleben.

Atlas Scholasticum. Gift of *T. T. Woodruff.*

PURCHASED.

The Alpine Journal, Vol. XIV. 103–106; XV. 107–110.

The Pioneers of the Alps. C. D. Cunningham and W. de W. Abney.

Mont Blanc. E. Viollet-le-Duc.

Above the Snow Line. Clinton Dent.

The High Alps in Winter. Mrs. Fred. Burnaby.

The Italian Alps. D. W. Freshfield.

The Frosty Caucasus. F. C. Grove.

Among the Selkirk Glaciers. W. S. Green.

Daylight Land. W. H. H. Murray.

Mount Washington in Winter.

Itinéraire Générale de la France: Provence. Paul Joanne.

Itinéraire Générale de la France: Auvergne. Paul Joanne.

Itinéraire Générale de la France: Franche-Comté. Paul Joanne.

Itinéraire Générale de la France: Les Cévennes. Paul Joanne.

Itinéraire Générale de la France: Les Pyrénées. Paul Joanne.

Dauphiné et Savoie. Paul Joanne.

Outing, Vol. XI. 6; XII.-XVI., XVII. 1–4.

The Statesman's Yearbook for 1890. J. S. Keltie.

Treasurer's Report for 1890.

RECEIPTS.

Cash on hand, Jan. 1, 1890			$880.10
Life-Memberships: Rev. Edward E. Hale, Rest F. Curtis, William C. Alderson, Samuel C. Lawrence, Julius A. Palmer, Jr., — 5 at $30			150.00
Admission fees:			
From 90 new members at $5		$450.00	
Assessments from 1 member for 1888.			
" " 7 members " 1889.			
" " 540 " " 1890.			
" " 5 " " 1891.			
Total . . 553 at $3		1,659.00	
Interest:			
On Permanent Fund to Jan. 1, 1890	$133.48		
On Reserve Fund to Jan. 1, 1891	48.59		
On Treasurer's Bank accounts	35.05		
		217.12	
Committee on Annual Reception, balance		3.73	
Donations:			
For Department of Art	$2.00		
For General Expenses	75.00		
W. J. Holland for Illustrating APPALACHIA	119.85		
W. H. Cades for general expenses	5.00		
Mrs. J. H. Thorndike for general expenses	10.00		
Mrs. J. H. Thorndike for Club Hut	1.00		
Miss I. Batchelder " " "	3.00		
Charles E. Fay " " "	5.00		
		220.85	
Sales of APPALACHIA and other Publications:			
"Mountaineering in Colorado"	$350.00		
500 Maps, White Mountains	37.50		
650 Maps, Blue Hills	81.25		
Maps of "Country about Boston"	568.09		
APPALACHIA	131.29		
		1,168.13	
Total Income			3,718.83
			$4,748.93

PAYMENTS.

To Trustees of the Permanent Fund,			
For 5 Life-Memberships		$150.00	
For interest on the Fund to Jan. 1, 1890, appropriated by the Club Jan. 9, '89, & Jan. 8, 1890		133.48	
			$283.48
To Trustees of the Reserve Fund,			
For Interest on the Fund to Jan. 1, 1891, appropriated to it by the Council in December, 1890			48.59
Postage and stationery		$171.85	
Printing and advertising	$128.59		
Club Register for 1890	114.74		
Meeting for Preservation of Nat'l Scenery	48.25		
		291.58	
Clerical services		181.00	
Expenses of meetings		58 35	
APPALACHIA, and other Publications,			
For Vol. VI. No. 1	$400.36		
Delivery of same	53.51		
For Vol. VI. No. 2	460.02		
Delivery of same	34.85		
Maps, "Country about Boston"	566.42		
" White Mountains	28.00		
" Blue Hills	81.25		
40 copies "Mountaineering in Colorado" for exchanges	40.00		
Sundries	18.54		
		1,682.95	
Library:			
For Books	$37.42		
For Binding	58.64		
		96.06	
Room, at No. 9 Park Street:			
For Rent	$400.00		
Care, Insurance, etc.	64.95		
		464.95	
Department of Improvements:			
For Repairs of Madison-Spring Stone Hut		46.07	
Department of Natural History:			
For expert examination of Mohegan Rock		8.00	
Department of Art:			
For Photographs and Albums	$33.86		
Art exhibitions	10.41		
Sundries	49.29		
		93.56	
Total expenses			3,094.37
Total payments			$3,426 44
Amount carried forward			3,426.44

Amount brought forward		$3,426.44
Cash on hand at close of the year:		
In Boston Five Cent Savings Bank	$533.64	
In Union Safe Deposit Vaults	788.85	
		1,322.49
		$4,748.93

Respectfully submitted,

JOHN E. ALDEN,
Treasurer.

BOSTON, Jan. 13, 1891.

BOSTON, Jan. 12, 1891.

The Auditing Committee respectfully report that they have examined the accounts of the Treasurer of the Appalachian Mountain Club, for the year 1890, and found them correct, with satisfactory vouchers for all payments. We have verified the cash amounting to $1,322.49.

W. R. DAVIS, } *Auditors.*
ALMIRA S. JOHNSON, }

STATEMENT OF RECEIPTS FOR FIRST FIFTEEN YEARS.

YEAR.	MEMBERSHIPS.					Life Membership.	Sales of APPALACHIA and other publications.	Interest.	Annual Reception.	Field Meetings and Excursions.	Donations.	Total.
	Admission Fees.	Yearly Assessments.	Back Assessments.	Advance Assessments.	Total.							
1876	252.00	....	....	....	252.00	....	43.13	....	....	....	....	295.13
1877	50.00	254.00	8.00	....	312.00	....	98.00	....	....	....	....	410.00
1878	54.00	264.00	....	....	318.00	60.00	75.70	....	....	....	48.00	496.70
1879	148.00	256.00	40.00	4.00	448.00	....	130.85	1.90	...	....	221.70	802.45
1880	178.00	332.00	24.00	4.00	538.00	90.00	116.90	10.79	....	....	86.21	841.90
1881	222.00	384.00	18.00	12.00	636.00	120.00	141.40	17.59	....	....	62.55	977.54
1882	256.00	528.00	74.00	....	858.00	90.00	309.43	22.07	....	....	2.00	1281.50
1883	395.00	1000.00	20.00	27.00	1442.00	210.00	197.58	89.72	9.72	82.88	22.00	2003.90
1884	285.00	1059.00	21.00	9.00	1874.00	60.00	93.51	58.29	26.80	11.47	1.00	1620.07
1885	375.00	1212.00	69.00	12.00	1668.00	60.00	113.19	61.09	.45	70.73	534.50	2507.96
1886	426.00	1317.00	90.00	24.00	1857.00	330.00	247.94	88.62	12.50	124.85	364.20	3024.61
1887	385.00	1491.00	90.00	42.00	2008.00	180.00	183.80	79.34	10.00	40.20	114.00	2615.34
1888	355.00	1536.00	117.00	12.00	2020.00	180.00	67.06	42.52	9.20	45.94	754.76	3119.48
1889	655.00	1617.00	69.00	27.00	2368.00	120.00	93.85	151.29	11.48	....	127.60[1]	2872.22
1890	450.00	1620.00	24.00	15.00	2109.00	150.00	1168.13	217.12	3.73	....	220.85	3868.83
Total	4486.00	12870.00	664.00	188.00	18208.00	1650.00	3080.47	785.84	83.88	375.57	2554.87	26737.63

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[1] Including $8.00 for keys.

STATEMENT OF EXPENDITURES FOR FIRST FIFTEEN YEARS.

Year.	Permanent Fund.	Reserve Fund.	Stationery, Postage, and Printing.	APPALACHIA and other Publications.	Department of Topography.	Improvements and Explorations.	Natural History and Art.	Clerical Expenses.	Expenses of Meetings.	Library.	Club Room.	Donations.	Total.
1876	....	....	109.91	140.86	....	15.00	....	....	....	....	....	....	265.77
1877	....	....	60.65	364.13	....	....	18.45	....	....	....	....	....	443.23
1878	....	....	202.31	169.80	2.00	20.00	52.48	....	....	....	....	....	446.59
1879	60.00	....	162.31	347.92	19.20	158.76	....	....	....	....	....	....	748.19
1880	90.00	....	186.17	318.13	19.00	72.60	....	....	....	....	....	....	685.90
1881	120.00	....	394.09	246.23	37.95	68.00	....	19.75	22.70	....	....	....	908.72
1882	90.00	....	258.99	675.93	25.40	....	....	34.50	25.00	....	....	....	1109.82
1883	281.72	....	389.73	366.27	23.65	160.37	....	67.41	1.88	69.78	....	....	1360.81
1884	113.42	....	382.49	1176.53	....	21.00	....	57.62	....	58.10	....	....	1809.16
1885	86.48	....	363.27	361.31	229.00	102.00	....	106.00	53.06	72.50	284.17	25.00	1682.79
1886	270.00	....	432.38	932.91	77.73	46.00	74.00	121.45	171.15	181.72	667.30	49.88	2974.52
1887	388.38	1000.00	289.38	566.71	538.97	123.02	20.12	107.12	145.45	102.50	504.81	....	3786.46
1888	280.00	100.00	473.95	597.59	....	779.55	3.32	49.50	98.45	120.56	456.12	....	2959.04
1889	220.00	114.70	390.77	1127.91	7.20	118.58	86.76	123.75	68.86	67.33	487.34	....	2813.20
1890	283.48	48.59	463.43	1682.95	....	46.07	101.56	181.00	58.35	96.06	464.95	....	3426.44
Total	2283.48	1263.29	4559.83	9075.18	980.10	1730.95	356.69	868.10	639.40	718.55	2864.69	74.88	25415.14

Report of the Trustees of the Permanent and Reserve Funds for 1890.

PERMANENT FUND.

1890.			
January 8.	Amount on deposit in Suffolk Savings Bank, Book No. 100,753		$1,268.16
January 8.	Amount on deposit in Provident Institution for Savings, Book No. 118,265	$865.32	
April 12.	Deposited Amount received from Treasurer A. M. C. for 3 Life-Memberships	90.00	
April 15.	Deposited Amount received from Treasurer A. M. C. for 1 Life-Membership	30.00	985.32
June 28.	Deposited Amount received from Treasurer A. M. C. for 1 Life-Membership. Now in Lexington Savings Bank, Book 1,921		30.00
1891.			
January 13.	Total of Principal on hand		$2,283.48

INTEREST ACCOUNT.

1891.			
	Interest on Deposit in Suffolk Savings Bank up to October, 1890	$51.22	
	Interest on Deposit in Provident Institution for Savings up to July, 1890 .	34.04	
	Interest on the Life-Membership of June 28 before depositing it in Lexington Savings Bank	.38	
	Total Interest on hand and subject to Action of the Club		$85.64

RESERVE FUND.

1890.			
January 8.	On hand as Loan to Massachusetts Loan and Trust Co., secured by their Note	$1,214.70	
1891.			
January 1.	Interest on the above for 1 year to date, at 4%, added by vote of Council, Jan. 8, 1891	48.59	
	Total on hand		$1,263.29

WM. H. NILES,
REST F. CURTIS,
ROBT. C. PITMAN, } *Trustees.*

BOSTON, Jan. 13, 1891.

Reports of the Councillors for the Autumn of 1890.

Natural History.

BY JULIA C. CLARKE.

THE year's work in Natural History has been mainly in the line of daily observations of temperature and of rainfall in the White Mountain region, for which the Club furnishes the proper instruments. This series was instituted by Professor W. M. Davis in the year 1886, and has been steadily continued since, under the direction of the New England Meteorological Society. Regular reports of observations are sent to the Society, and are published in their monthly Bulletin, in connection with the reports of two hundred and fifty similar observers, who are scattered throughout New England and in Eastern New York.

The Appalachian Mountain Club list of stations and observers is as follows: North Conway, Mr. J. L. Binford; Plymouth, Miss Helen M. Clark; Berlin Falls, Mr. O. F. Cole; Berlin Mills, Mr. Q. A. Bridges; Stratford, Mr. N. B. Waters; West Milan, Mr. A. A. Higgins.

The thanks of the Club are due to these observers for their patient and faithful service.

Only from such data, perseveringly collected at many different stations for a considerable duration of time, can scientific generalizations in meteorology be made; and the mountain phenomena offer a peculiarly valuable field of research.

It is extremely desirable to increase the number of such observers in the White Mountains; and this point is emphasized now in the hope that all Club members, who can, will take pains to further this end. One form of help would be to give information of acquaintances residing in the mountain region who even possibly might do service as observers, should the matter be brought definitely before them.

Reports of the Councillors for the Autumn of 1890.

Topography.

THE Councillor regrets that he is unable to report the publication of any maps other than the Map of the Country about Boston, in the preparation of which he took part. This map has had a good sale, and has undoubtedly served to awaken in many persons an intelligent interest in Topography.

Owing to the absence in Europe of the former Councillor, Mr. A. E. Burton, it has been impossible to proceed with the map of Moosilauke which was undertaken by him; but there is no doubt that progress will be made when he returns. A topographical map of Monadnock, the work of the United

States Geological Survey, has been received from Professor Raphael Pumpelly, who writes that the Director of the Geological Survey consents to its publication by the Club. As this sheet only requires to be traced, the Councillor hopes to see it printed and published before the close of the year.

In April the Council appointed a committee consisting of the President, the Secretary, and the Councillor of Topography, and gave them power to call "a meeting of persons interested in the preservation of scenery and historical sites in Massachusetts." The Committee accordingly issued the circular of invitation a copy of which is appended, and sent the same to about twenty-five hundred persons whose addresses had been obtained by means of a preliminary letter sent to widely scattered individuals. The meeting took place at the Institute of Technology on May 24, 1890. It was attended by about one hundred much interested persons, who listened first to Mr. Mann's account of the cordial replies which had been received from about five hundred of the persons invited. Mr. Eliot followed with a statement of the reasons which induced the calling of the meeting; and Mr. J. B. Harrison, of New Hampshire, with Hon. Leverett Saltonstall, Professor C. E. Norton, Judge Shurtleff, and the Chairman, Hon. Henry H. Sprague, made interesting remarks.

The meeting adopted a resolution which called upon the Chairman to appoint a committee to promote the preservation of the beautiful and historical places of the State; and, at its first meeting, this committee organized by the election of Dr. H. P. Walcott as chairman, George Wigglesworth, Esq., as treasurer, and Charles Eliot as secretary. The Committee has increased its membership, until it now consists of twenty-nine persons, representing all parts of the State. A sub-committee has reported in detail a plan of organization which it is believed will greatly facilitate the preservation of the places in question; another sub-committee is engaged in devising the necessary legislation; two circulars of information have been issued and distributed. Although it is not a topographical matter, the Councillor assumes that it is proper for him to report thus much of the doings of a committee which came into existence through the action of the Council of the Appalachian Mountain Club.

Appalachian Mountain Club,
9 Park Street, Boston, 10th May, 1890.

Dear Sir, — At a meeting of the Council of the Appalachian Mountain Club held on Wednesday, April 2, 1890, it was unanimously —

Voted, That Messrs. Eliot, Mann, and Lawrence be a committee to call a meeting of persons interested in the preservation of scenery and historical sites in Massachusetts.

In accordance with this vote, you are hereby invited, with friends who may be interested in the subject, to take part in a conference to be held in Boston, at the Massachusetts Institute of Technology, Boylston Street, at 12 o'clock, on Saturday, May 24, 1890. Hon. Henry H. Sprague will preside; and among those who will either attend the meeting or send letters are Governor Brackett, Gen. Francis A. Walker, Dr. O. W. Holmes, Col. T. W. Higginson, Mr. Francis Parkman, and Mr. Frederick Law Olmsted.

Please use the enclosed postal-card to inform the committee whether or not they may expect you.

You are also requested to examine and consider the statements and proposals of the circular which accompanies this letter, and if you cannot attend the conference, you are respectfully urged to communicate your opinions and suggestions in writing to Charles Eliot, 50 State Street, Boston, before the day of the meeting.

Yours truly,

Charles Eliot,
George C. Mann,
Rosewell B. Lawrence,
Committee of Council of A. M. C.

AN OUTLINE OF A SCHEME

For Facilitating the Preservation and Dedication to Public Enjoyment of such Scenes and Sites in Massachusetts as possess either Uncommon Beauty or Historical Interest.

There is no need of argument to prove that opportunities for beholding the beauty of Nature are of great importance to the health and happiness of crowded populations. As respects large masses of the population of Massachusetts, these opportunities are rapidly vanishing. Many remarkable natural scenes near Boston have been despoiled of their beauty during the last few years. Similar spots near other cities of the Commonwealth have likewise suffered. Throughout the State scenes which future generations of townspeople would certainly prize for their refreshing power are to-day in danger of destruction. Unless some steps toward their effectual protection can be taken quickly, the beauty of these spots will have disappeared, the opportunity for generous action will have passed.

Scattered throughout the State are other places made interesting and valuable by historical or literary associations; and many of these also are in danger.

What public or private, general or local, action in aid of the preservation of fine natural scenes and historical sites will it be best to attempt under existing circumstances in Massachusetts? This is the problem which will be the subject of debate at the conference called by the Council of the Appalachian Mountain Club; and it is only for the purpose of provoking discussion that the Committee which has been authorized to call the meeting makes the following proposals: —

1. The establishment of a Board of Trustees to be appointed as follows: Some to be named in the act of incorporation, — their successors to be elected by the full Board as vacancies occur, some to be named by the governing bodies of several designated incorporated societies, such as the Massachusetts Historical Society, the Essex Institute, the Appalachian Mountain Club, etc; some to be appointed by the Governor and Council.

2. The Trustees to be empowered to acquire by gift from individuals, or bodies of subscribers, parcels of real estate possessing natural beauty or historical interest, and to hold the same, together with funds for the maintenance thereof, free of all taxes.

3. The Trustees to be required to open to the public, under suitable regulations, all such parcels of their real estate as lie within the limits of those towns and cities which may provide police protection for the same.

4. The Trustees to be prohibited from conveying real estate once accepted by them, except to towns and cities for public uses.

In order to effect the creation of this proposed Board of Trustees, the Committee suggests: —

5. The appointment by the meeting of May 24 of a Standing

Committee of twenty-five, to be provided by the meeting with a working fund and empowered —

a. To draft and present to the General Court at its next session an act of incorporation.

b. To correspond with societies and individuals for the purpose of deciding upon two or three parcels of suitable real estate which, with endowments for maintenance, may be offered to the Trustees immediately upon their incorporation.

c. To secure subscriptions to an endowment fund with the income of which the Trustees may meet their general expenses.

Reports of the Councillors for the Autumn of 1890.

Art.

THE time prescribed by custom for the report of the Councillor of Art proves to be this year a trifle early, since three or four matters which will probably be completed before the end of the year are not yet in condition to allow of discussion.

A considerable proportion of the expenditures for the year have been for much needed furniture and fittings, including a frame (familiar to frequenters of the room) for displaying unmounted photographs, and the pigeon-hole case for the albums.

The fine collection of photographs which was brought together at the time of the Annual Reception through the efforts of the Reception Committee, seemed too good to be dispersed with but a single opportunity for inspection; and on this account it was removed entire to a vacant room in the Ticknor Building, and was opened to members on February 12–15. To Mr. Gates-Fairbanks the Club is indebted for the free use of the room. Mrs. Ritchie loaned rugs and furnishings to make the same presentable; Mr. Chubbuck contributed a framework upon which to hang the pictures, and other members of the Club gave valuable assistance. The exhibition included some fifteen hundred photographs, many in books, some framed, and others on mounts which were hung on the walls. Mr. Percival Lowell loaned a series of Japanese views from his own camera. Mr. H. G. Peabody, Mr. Edmands, Mr. Freeborn, Mr. Scott, Miss Hardwick, Mrs. Thorndike, and many others were represented by books or pictures. Some five hundred persons visited the room during the exhibition. This constituted the second exhibition of the Art Department since the formation of the Club.

Mr. F. H. Chapin, of Hartford, having sent, for the inspection of the Publishing Committee, a series of Caucasian views from the camera of Vittorio Sella of Biella, they were secured by the department, and placed for public examination on the Club Room walls. This exhibition, which was open on May 12–17, attracted two hundred visitors. A fourth exhibition is announced of views taken by members in localities visited by the Club this year on excursions or outings.

During the year two Colorado books from the camera of Mr. F. H. Chapin have been added to the Art Library,—

No. 5. San Juan, Snæfell, Silverton, 48 views.
No. 6. Mancos Cañon, 48 views.

One volume, intended for the views of Middlesex Fells donated by Mr. Cades, is not yet completed. Two small volumes, containing views of each of the second and third art exhibitions, taken by the Councillor, are in the Club Room. Some four other volumes are under way, and it is hoped that they may be completed before the close of the year.

Report of the Excursion Committee for 1890.

COMPILED BY W. R. DAVIS.

THE excursions of the Club for the year were seven in number, namely: a Winter Excursion to Randolph, N. H.; Hoosac Tunnel; Warwick, Mass.; Field Meeting at North Woodstock, N. H.; Randolph, N. H.; Mt. Moosilauke; and Shepard Hill, near Squam Lake, N. H. There were thirty Saturday outings, three field studies, one snow-shoe walk, and eight all-day and long walks, — a total of forty-nine.

On Thursday, May 30, a party of thirty-five left Boston for HOOSAC TUNNEL. Three others later joined the party, which was conducted by Mr. Ritchie. Trips were made, May 31, through the Tunnel by special train to North Adams, thence by carriages to Greylock Mountain, twenty-four walking and thirteen riding to the top of the mountain. June 1, twelve went to the Cascades and twelve to Hoosac Mountain. June 2, twenty visited Readsboro'. Tuesday, June 3, thirteen left for Warwick, Mass. Trips were made, June 4, to Winchester, N. H., by thirteen; June 5, to Royalston Falls, by eleven; June 6, to Moar's Pond, by nine. The Committee were Messrs. Ritchie and Jones.

The July field-meeting was held at the Deer Park Hotel, NORTH WOODSTOCK, N. H., one hundred and thirteen members and friends attending. The party left Boston July 1. The meeting for the presentation of papers was held on the evening of Tuesday, July 1. July 2, forty-one members ascended Loon Pond Mountain, others driving to Hix Mountain House. July 3, a heavy rain prevented a proposed trip to Mt. Moosilauke. Twenty-one walked in the rain to Agassiz Basin in the afternoon. July 4, sixty-eight rode to Pollard's. Twenty of this number took lunch and walked up the East Branch of the Pemigewasset. Agassiz Basin was visited. The day was celebrated by a display of fireworks in the evening. July 5, three parties were made up. Six took a long walk over Mts. Liberty, Haystack, Lincoln, and Lafayette to the Profile House, returning by coach the same day; twenty formed a camping party for a similar trip, spending the night in col between Mts. Liberty and Haystack, and returning the next day; the rest of the party visited the Flume, Pool, Profile, and Echo Lakes, sixty-three riding to the Flume House. A small party ascended Mt. Lafayette. July 6, informal parties visited Georgiana Falls, Agassiz Basin, and Parker Ledges. July 7, stage was taken for the Flume House; Mt. Pemigewasset was ascended, and the Flume visited. Messrs. W. R. Davis, J. E. Alden, Mrs. J. H. Thorndike, Mrs. A. F. Cutler, and Miss Isabel Batchelder were the Committee.

On Tuesday, July 8, thirty-nine of the North Woodstock party started for RANDOLPH, N. H., seventeen others joining this party later. The journey was made *via* the Profile House, Bethlehem Junction, Whitefield, and Jefferson, dinner being taken at the Chiswick Inn at Whitefield, from which the party went by carriages to the Ravine and Randolph Hill Houses. July 9, a trip was made to Triple and Coösauk Falls. July 10, a large party went to the floor of King's Ravine, seven of the number climbing the head wall and joining a party of seven who had ascended to Madison Hut over Durand Ridge. Eleven spent the night at the Hut, returning over the Castellated Ridge the next day, after having climbed Mts. Madison, Adams, and Jefferson. July 11, another camping party of eleven left for the Hut, returning next day *via* Salmacis Falls. One of the party walked over the Presidential range to the summit of Mt. Washington, returning by way of the Glen House and Gorham. July 12, a third party of eleven camped at the Hut, returning on the 13th over Nowell's Ridge. July 13, there were trips to Salmacis Falls and Randolph Hill. July 14, the Ice Gulch was explored.

July 10, a party rode to the summit of Mt. Washington, returning the same day. July 15, the party returned to Boston. Messrs. Ritchie and J. A. Crosby conducted the excursion.

Friday, August 29, a party of twenty-two left Boston for MT. MOOSILAUKE. The party was divided, eleven spending two nights at the Tip Top House, the others at Breezy Point. August 30 was stormy in the morning, but there was a drive in the afternoon to the Hermitage and old mill. Two walked to the Tip Top House. August 31, the party at Breezy Point went up to the summit, five riding. The whole party dined together at the Tip Top House, the first party returning in the afternoon to the lower house. September 1 was foggy in the morning, but cleared at noon, allowing a fine view. Walks were taken to the South Peak and east shoulder. Seven others joined the party, making the whole number on the excursion twenty-nine. Mr. W. R. Davis conducted the party, which returned to Boston on September 2.

The Autumn Excursion took forty-three members and friends to SHEPARD HILL, near Squam Lake, N. H. The party left Boston September 24, for the headquarters at the Asquam House, Holderness. Trips were taken upon the Lake, to Squam Mountain, Mt. Prospect in Plymouth, Red Hill, and Peaked Hill in Bristol. Mr. Ritchie conducted the party.

The outings have been well attended.

The long walks were the following: the first, on April 3, was over the Blue Hill range, nine miles, forty-one persons attending. Thirty-five others walked from Readville to Great Blue Hill. Second, April 19, a mayflower party, from Kingston to Duxbury, eight miles and a half, sixty-three persons. Third, May 24, to Moose Hill, Sharon, six miles, ninety-four persons. Fourth, June 17, a laurel trip, to Mount Hunger in Ashburnham, *via* Fitchburg, Mass., fifty-one persons. Carriages were provided, the distance being thirteen miles. Fifth, June 21, in Concord, Mass., eight miles, sixty-seven persons. Sixth, November 4, to Gloucester, Norman's Woe, Rafe's Chasm, and Magnolia, seven miles, twenty-eight persons. Seventh, November 15, to Ship Rock and Peabody Bowlders, seven miles, seventy-one persons.

The walks of the Field Study section were as follows: May 3, in Dedham, two miles and a half, fifty-eight persons; May 31, Arnold Arboretum, fifty-six persons; October 11, Bartholomew's Pond, four miles, thirty-four persons.

As the winter was unfavorable, but one snow-shoe walk was taken, on March 8, to Rattlesnake Hill, East Quincy, four miles, seventeen persons.

The excursions were attended by 301 members and friends, the outings by 1337 persons, of whom 674 were ladies, making a total of 1638. One lady has taken thirty-one of the outings and six excursions.

Proceedings of the Club.

December 10, 1890. — One Hundred and Fifteenth Corporate Meeting.

President Mann in the chair.

One hundred and five persons were present. Seven candidates for membership were elected.

The report of the Councillor of Natural History described the work done in the line of observations of temperature and of rainfall in the White Mountain region, and gave the names of observers using Club instruments. (See p. 256.) The Councillor of Exploration reported work done the past summer in Maine, especially in the Moose River region.

A paper entitled "A Trip to the Seven Ponds in Maine," by Mr. H. H. Campbell, was read by Mr. A. E. Scott. Interesting descriptions of scenery and of several mountain ascents were given. (See p. 221.)

Miss M. A. J. Frothingham presented a paper entitled "From the Gemmi to the Breithorn." The description of the ascent of the Breithorn by the writer and another lady member of the Club was particularly interesting.

December 18, 1890 (Evening). — Special Meeting.

President Mann in the chair.

Eighty persons were present.

Mr. Charles G. Van Brunt presented a paper entitled "An Ascent of Sierra Blanca, Colorado." A vivid description of the difficulties of the ascent of this grand mountain was given. (See p. 163.) Professor C. E. Fay spoke of an unsuccessful attempt to reach the summit made by Mr. J. R. Edmands and himself, in company with Mr. Van Brunt, a few weeks previous to the successful trip just described, and showed a few lantern views illustrating the peak. Remarks were also made by Mr. S. H. Scudder.

Mr. R. B. Lawrence showed twelve lantern views of scenery in Northern Maine.

January 14, 1891. — One Hundred and Sixteenth (Annual) Corporate Meeting.

President Mann in the chair.

Eighty-five persons were present. Professor Raphael Pumpelly and Mr. J. B. Harrison were elected Corresponding members, and eight candidates for Corporate membership were also elected.

It was voted to ratify the action of the Council in appropriating to the Permanent Fund all interest accumulated on said Fund to the time of the last payment of interest on the investment. It was also voted to ratify the action of the Council in appropriating to the Permanent Fund one hundred dollars.

The Annual Reports of the Recording and Corresponding Secretaries, Treasurer, Trustees, and Auditors, and Excursion Committee were presented and accepted. For these Reports see pp. 245–264.

Mr. Gardner M. Jones, Chairman of the Committee on the Nomination of Officers, presented the following list: President, Rest F. Curtis; Vice-President, Byron Groce; Recording Secretary, Rosewell B. Lawrence; Corresponding Secretary, Frank W. Freeborn; Treasurer, John E. Alden; Councillors: Natural History, Miss J. C. Clarke; Topography, Charles Eliot; Art, Charles H. Ames; Exploration, John L. Batchelder, Jr.; Improvements, Warren Upham; for Trustee of the Permanent Fund for three years, Isaac Y. Chubbuck.

The balloting for officers resulted in the election of those nominated, sixty-nine ballots being cast.

The retiring President, Mr. George C. Mann, addressed the Club concerning its work and interests, and then introduced the President-elect, Mr. Rest F. Curtis, who assumed the chair.

Mr. Frank O. Carpenter presented a paper describing the Stratford Mountains, N. H., and Mr. Frank W. Freeborn presented his third paper on Adirondack Paths. (See p. 231.)

The following vote was then unanimously passed: That the Club regrets the absence from its Annual Meeting of Mr. John Ritchie, Jr., and extends to him cordial wishes for his continued improvement in health.

February 11, 1891. — One Hundred and Seventeenth Corporate Meeting.

President Curtis in the chair.

One hundred and thirty persons were present. Nine candidates for Corporate membership were elected.

The President then read the resignation of the Recording Secretary, tendered on account of a contemplated absence of six months. It was voted to lay the resignation upon the table, to request the President to appoint a committee to nominate a temporary Recording Secretary, to request that committee to report to the Council, and to authorize the Council to elect a temporary Recording Secretary of the Club.

Professor W. H. Niles exhibited to the Club two maps of the United States just issued by the Geological Survey, one showing hydrography and contours, the other showing, in addition, political divisions and names.

Mr. Rosewell B. Lawrence then presented a lecture entitled "The Carolina Mountains," with ninety-four stereopticon illustrations of mountain and river scenery and of people and places. Ascents of Grandfather, Roan, Mitchell, and other peaks of the Black and Craggy ranges, were described.

March 19, 1891 (Evening). — One Hundred and Eighteenth Corporate Meeting.

President Curtis in the chair.

The President announced that the Council, to whom had been given the duty of electing a temporary Recording Secretary of the

Club, had elected William H. Sylvester. The action of the Council was ratified.

One hundred and seventy persons were present. Six candidates for Corporate membership were elected.

The President announced that the Club had been represented by its Committee before the Legislature in a hearing with regard to promoting the preservation of beautiful and historic places in Massachusetts.

On the recommendation of the Council, the Club changed the rule in relation to issuing APPALACHIA to read: "That APPALACHIA be sent to all who are members of the Club at the time the number is issued."

The President announced the death of ex-President Robert C. Pitman, and the meeting voted to request the Council to consider a more extended notice of his death.

Professor Charles E. Fay then delivered a very interesting lecture, illustrated by the stereopticon, upon "Mountaineering on the Crest of the Continent." After a general view of the great watershed in Colorado, Professor Fay gave a description of Estes Park and of ascents of Ypsilon and Long's Peak.

April 8, 1891. — One Hundred and Nineteenth Corporate Meeting.
President Curtis in the chair.

Mr. F. W. Freeborn was elected Recording Secretary *pro tem.*

One hundred and eighty-four persons were present. Seven candidates for Corporate membership were elected.

The President called attention to two maps on exhibition: one of Mt. Monadnock, published by the Club from the original sheet of the U. S. Geological Survey with the permission of the Director; the other, a map of Lake Winnepesaukee, on a scale of two miles to an inch.

The following minute was adopted: "The Appalachian Mountain Club has learned with sorrow of the death of its ex-President, Judge Robert C. Pitman, and desires to express its appreciation of the services rendered by him to the Club."

Mr. Warren Upham read a paper entitled "A Classification of Mountain Ranges according to their Structure, Origin, and Age." (See p. 191.) Professor Niles, in discussing the paper, spoke of the difficulty of a satisfactory classification of mountains, and suggested that the orographic features should first be considered; after this, regard should be had to the internal features of the mountains; then, in turn, the mode and time of formation. He doubted whether the weight of ice in the glacial periods was sufficient to cause the changes in the crust of the earth generally attributed to it.

Mr. C. G. Van Brunt read a graphic account of his experience with a small party in an ascent of Mt. Adams in a midwinter storm. They went up from the Ravine House, by way of Durand Ridge, on December 26, 1890. A violent snow-storm met them on the way. They spent the night at the Club Hut, and ascended Mt. Adams the next morning, returning to the Ravine House the same day by way of Snyder Brook, the wind being too violent to make it safe to go over Durand Ridge. The paper was illustrated by a dozen slides.

April 30, 1891 (Evening). — Special Meeting.
President Curtis in the chair.

One hundred and seventy-five persons were present.

The President gave notice that the Geographical Exhibition of the Brooklyn Institute would be displayed at the Winslow Skating Rink, free to the public, for three weeks, beginning May 11.

Mr. Emil Huber, of Zurich, Switzerland, a member of the Swiss Alpine Club, read an interesting paper on his explorations among the Selkirk Mountains of British Columbia. The lecture was profusely illustrated with interesting lantern views from photographs made by Mr. Huber. After his companion, Mr. Carl Sulzer, had made a few remarks, Professor C. E. Fay told of his own brief visit to the Selkirks last summer.

May 13, 1891 (Evening). — One Hundred and Twentieth Corporate Meeting.
President Curtis in the chair.

About one hundred and twenty-five persons were present. Ten persons were elected to Corporate membership.

The President announced that the Geographical Exhibition had been brought from Brooklyn, and was now open to the public under the auspices of the Club.

Rev. Henry G. Spaulding gave a lecture upon "Landscape in Literature, Nature, and Art." He said that love for the beauty of Nature was largely a modern sentiment, and that, although the feeling for landscape beauty existed in all periods, and even in savages, the ancients stopped far short of the feeling which modern writers possess. Æschylus and Homer expressed it in simple terms; and literary similes and metaphors among the Greeks and Romans, so far as they went, were similar to those in modern writers. The grand and the sublime did not appeal to them as they do to us. Race and climate may have much to do with this. The Greeks and Romans admired Nature; we love it. The essayist declared that in Greek and Latin literature there was no word for "feeling" in relation to natural beauty. He compared Horace's brief allusion to Mt. Soracte with Coleridge's "Hymn before Sunrise in the Vale of Chamouni." To Homer the sea is repulsive, — it is the sea from which no grapes can be gathered; to Byron it is an object of love. The art of the ancients was objective; they simply reproduced Nature. Our art and literature are subjective; they reveal the relation between Nature and the inner life of man. Wordsworth was wrong when he assumed that the ancient pagans lived nearer to Nature than the moderns live; for Wordsworth himself was immeasurably nearer to Nature than any ancient writer.

The ancients saw nothing in Nature but human shapes and human relations; the old mythology was a make-believe world. The speaker contended that the modern love of Nature is essentially Christian. The Pagan saw in Nature only man, and the Pantheist only God; the Christian sees God as the source, and man and Nature as two streams springing from that source. Quotations were read from Robert Browning and other modern poets. After the lecture, Mr. Spaulding had thrown upon the screen views of frescos and harbor scenes from Pompeii, views of Greek sculpture, some interesting ancient illustrations to Homer's Odyssey, and other ancient and modern pictures, including some of Turner's landscapes.

June 10, 1891. — One Hundred and Twenty-first Corporate Meeting. President Curtis in the chair.

Sixty-eight persons were present. Mr. J. B. Harrison was elected an Honorary member; and Signor Vittorio Sella, of Biella, Italy, and Edouard Alfred Martel, of Paris, France, Corresponding members of the Club. Twenty-two candidates for Corporate membership were also elected.

Professor S. F. Whiting read an interesting paper entitled "Through the Great Glen of Scotland to the Top of Ben Nevis."

The President announced the marked success of the Geographical Exhibition recently held. (See p. 235.)

Mr. John L. Batchelder, Jr., read a paper of interesting and amusing experiences, "On Foot from Salzburg to Geneva," in the summer of 1889, and described an ascent of Mt. Blanc and return in twenty-eight hours.

Officers for 1891.

President.

Rest F. Curtis, 146 Falmouth Street, Boston.

Vice-President.

Byron Groce, 4 Schuyler Street, Roxbury.

Recording Secretary.

Rosewell B. Lawrence, 23 Court Street, Room 409, Boston.

Corresponding Secretary.

Frank W. Freeborn, 9 Park Street, Room 17, Boston.

Treasurer.

John E. Alden, 18 Post Office Square, Boston.

Councillors.

Natural History, Miss J. C. **Clarke**, 505 Columbus Avenue, Boston.
Topography, **Charles Eliot**, 50 State Street, Boston.
Art, **Charles H. Ames**, 5 Somerset Street, Boston.
Exploration, **John L. Batchelder, Jr.**, Jamaica Plain.
Improvements, **Warren Upham**, 21 Newbury Street, Somerville.

Trustees of the Permanent Fund.

Rest F. Curtis. **Robert C. Pitman.**
Isaac Y. Chubbuck.

Members added since December, 1890.

HONORARY MEMBER.

Harrison, J. B., Franklin Falls, N. H.

CORRESPONDING MEMBERS.

Martel, Edouard A., Paris, France.
Pumpelly, Raphael, Newport, R. I.
Sella, Vittorio, Biella, Italy.

CORPORATE MEMBERS.

Abbott, Walter B., Salem.
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Baker, Miss Esther M., Dorchester.
Baker, Miss Philena, Dorchester.
Baldwin, Thomas T., Boston.
Barry, Miss Mabel G., Melrose.
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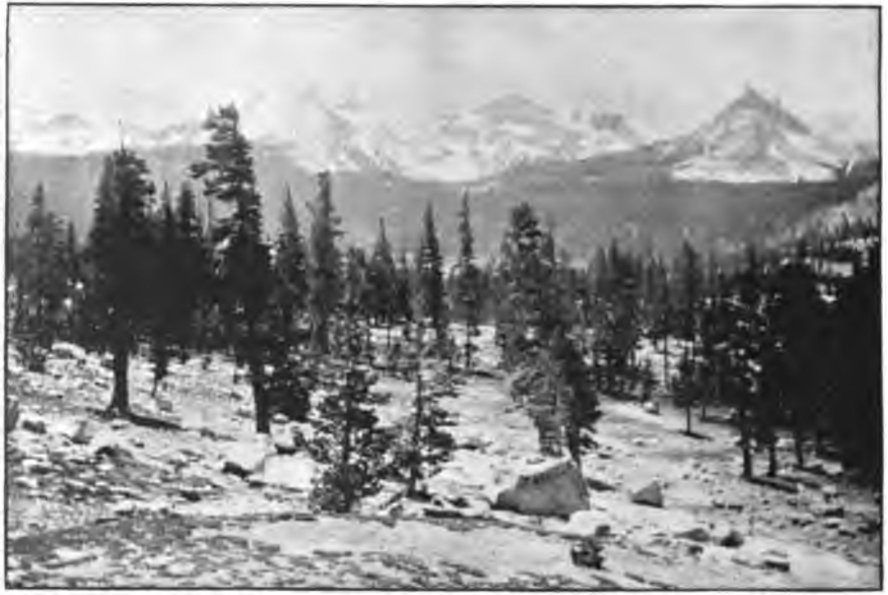
Tileston, Roger E., Mattapan
Van Brunt, Chas. G., Cambridge.
Walker, Joseph B., Concord, N. H.
Waters, Mrs. Amelia F. U., Boston

Plate XII.



THE CATHEDRAL PEAK GROUP (SIERRA NEVADA).

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Camping in the Highest Sierras.

BY HUBERT DYER.

Read January 13, 1892.

EVERY one has heard of the Yosemite, but very few persons know of the wilderness of Alps of which that famous valley is but the gateway. The Sierra Nevada of California for an interval of two hundred miles, between Walker's Pass at the south and Sonora Pass at the north, is almost an unknown land. Even the settlers on the neighboring plains are profoundly ignorant of its fastnesses. The High Sierras are accessible during only three or four months in the year, and even then only by parties thoroughly equipped and well prepared for roughing it. A trip in these mountains is no idle pastime; good mountaineering is necessary, if one wishes to leave the few beaten trails and penetrate into the deeper cañons.

The beautiful region immediately adjacent to the Yosemite is visited every summer by a few Californians, and sometimes an Eastern tourist manages to reach the district under the escort of a guide, but in general it remains an unfrequented wilderness. Farther south, along the range, the mountains increase in elevation and in grandeur till their culmination is reached in Mt. Whitney, the highest peak in the United States. The greater elevation causes a corresponding increase in the complexity and nobleness of the mountain structure, which reaches its maximum development a few miles north of Mt. Whitney in the country about the forks of the San Joaquin and King's River. The stupendous mountain mass rises slowly from the western plains, ascending for a hundred miles to a jagged granite crest of nearly 15,000 feet elevation; then it falls suddenly, in an almost unbroken wall of 11,000 feet, into the Mono and Inyo valleys. These valleys seem almost like bits of some Inferno; they are wastes of volcanic sands and ashes, of lava overflows, of spouting hot springs, and the brackish remnants of ancient seas. Were it not for the hundreds of streams fed by the melting snows of the Sierras, these valleys would be wholly uninhabitable. In the two hundred miles of interval already alluded to there are occasional advances of pioneer life into the wilderness, though human beings rarely penetrate into the heart of the land. The only exception is the sheep-herder, who is found in every meadow. Some localities are visited every year by a few camping-parties, but one may travel for weeks without seeing other campers or meeting a single mountaineer.

One summer day in 1889 I stood on the summit of Mt. Lyell, a glacier-surrounded crest pronounced inaccessible by Clarence King, and looking over the peaks of a multitude of sky-piercing mountains, saw far to the southward the matchless region of the Minarets and Mt. Goddard. At that moment I determined to form a small party to visit the most remote districts of the Sierra, to attempt the ascent of Mt. Whitney, and to traverse the Owen's River Valley.

It was already late in July, too late to undertake such an extensive trip; so I returned home, took ample time to form my party, and spent many hours during the spring of 1890 in getting ready. Routes and ways of travel were closely studied, and thorough preparations made for a stay of not less than ten weeks in the mountains. All our camp equipage, provisions, extra clothing, ammunition, etc., were to be carried on three Mexican "burros." We obtained a very light tent, and a complete but compact cooking outfit. Each man was to have an extra suit of underclothing, several pairs of heavy shoes, and one or two small personal conveniences. We bought a good camera, with film for 350 exposures; the

United States Coast and Geodetic Survey furnished us with a three-inch transit, and an aneroid barometer reading to 20,000 feet. Our arms were two "new model" Winchesters, one shot-gun, pistols, and hunting-knives.

From scraps of information gathered here and there we planned an approximate route. Fresno, a railroad town two hundred miles south of San Francisco, was chosen as our base of supplies for the first stage. From that place we planned to proceed due east into the Sierras, aiming for the Grand Cañon of King's River, about one hundred miles away. After making a temporary camp there, we would arrange for short excursions into the surrounding country. From this cañon we would attempt to cross the main crest by the Kearsarge Pass to Independence (Inyo County), which would be made our new base of operations for a trip to Mt. Whitney. Leaving Independence after returning from the ascent of Whitney, we would proceed up the Owen's River Valley for one hundred and twenty miles to Mono Lake, cross the Sierras again by Mono Pass to Mt. Conness, spend a day or two there with Professor George Davidson of the Coast Survey, and thence go on to the Yosemite. After leaving the valley we would visit Hetch-Hetchy, and crossing the densely wooded regions of the Tuolumne, finally rest at the famous mining-town, Angel's Camp, in Calaveras County. This itinerary covered, as we estimated, over six hundred miles of mountain trails.

The last day of June found us tramping steadily through the Fresno foot-hills, climbing long wearisome slopes and pine-clad ridges, or descending into deep cañons. This continued till, on July 2, we reached the Visalia grove of Sequoias, or Big Trees, which lie sixty miles from Fresno, at an elevation of 5,000 feet. Late the same day we plunged into the great forest, here consisting of pines, spruces, and the mighty Sequoias. The last are scattered in small groups through the timber. We had heard of one particularly fine grove that our party intended to visit, but we missed it by following the wrong trail. Darkness came on before the blunder was discovered; so we camped near a pretty meadow, and awaited daylight.

The following day, while two other parties explored in other directions, Guy and I retraced our way a mile or more to a branch trail, which, being followed down, led to the Big Tree Grove, where we passed several hours studying and admiring the giants. Here we met two packers bound for the cañon, who, upon being questioned about the route forward, told us that we might go along with them. Hurrying back to camp, we told our good news, and hastily packing the mules, prepared to join them.

For a day and a half we travelled in their company through a silent wilderness of pine-clad mountains. On several high ridges the way led over snow; and in the deep cañons between, we traversed beautiful meadows and forded swollen streams of icy water. Once we rose very early, breakfasted by starlight, and descending a dark hill for an hour or more, came at last to a torrent rushing swiftly down a broad, bowlder-strewn bed. Several slender logs stretched across to a rocky islet in mid-stream, from which in turn another flimsy bridge reached to the farther bank. Sheepmen had built it to drive their flocks across. We tried to lead Roxy, our best pack-mule, over on it; but when half-way, he fell into the stream, and had not a long rope been previously tied to him, it would have been the last of him. As it was, it was a hard pull to get him through, and he was swept down stream some distance before we could land him. Then, after prudently removing their packs, the other animals were taken over in the same way. Even as we worked, the water was rising perceptibly; for the stream had its sources in the snows higher up, and the warm sun was already setting loose new floods of water.

During the afternoon of the same day, July 4, while proceeding along an elevated ridge, we caught occasional glimpses towards the rugged crest of the mountains, and at one place had a clear view of the great divide between the South and Middle Fork of King's River, and up the terrible gorge of the Middle Fork, — a cañon whose bare granite walls rise into snowy heights from 3,000 to 6,000 feet above the river. An irregular band of bright red, whose warm coloring seemed singularly out of place, ran across the lower end of the Tehipitee Divide. Now and then an opening in the dense forest allowed a glimpse of the cañon of the South Fork and, beyond it, of a white granite spire towering high above forest and snow. These occasional foretastes whetted our desires to a sharper edge, so when Fox, our volunteer guide, bade us secure the packs once more before starting down the long hill to the floor of the valley, we were eager, expectant, and excited; not the less so because Fox had just killed a large rattlesnake, — a performance we ourselves repeated seventeen times during the two weeks' stay in the valley.

So, with a re-arrangement of the packs and an unusually strong pull of the "diamond-hitch," we start down. The trail growing dim and dimmer, we stretch out along the mountain-side to keep Fox in sight, but are delayed at a rocky water-swept crossing, and so follow only by the hoof-marks of his horses. But soon the way grows plain again, the great hill begins to fall away rapidly, and the descent is begun in earnest. I watch the aneroid as we go on; the needle turns slowly, but in half an hour it marks 750 feet less, an hour later an additional 1,500 feet, and we are still going down. The trail bends and rebends with short and sudden zig-zags, so that our line wavers to and fro across the mountain-side, a few feet lower every time. The rear man can easily toss a stone to the head man, but he must travel many rods before he reaches the same level. Fox is long since out of sight. We have seen him disappear far down under the pines, and Guy is fast leaving us in the rear. The packs ride firmly, but are heavy; finally, Roxy weakens and seems about to fall; so, signalling to Guy, we remove the hundred pounds of flour and fifty of sugar, — the flour to his horse, the sugar to Pheby's shoulders. Faster time is made now; the aneroid rises steadily, till at 6.25 it marks a fall of 3,000 feet, while the watch shows that two hours have been passed on the hill. We are now on the floor of the cañon. Ten minutes later we reach Fox's camp, and, going a hundred yards beyond, we pitch our own beside the roaring stream.

What a magnificent stream King's River was at our lower camp! A hundred feet wide, probably ten or fifteen deep, and rushing along with fearful velocity over an uneven, bowlder-strewn bed. Its surface was broken into a tumultuous, seething mass of billows, which here and there dashed swiftly against the banks. But beautiful though it was, it worried us very much; for our plans necessitated a crossing, — two, in fact, before we could continue the journey to Independence. We had never dreamed of such a torrent. However, we put the matter aside to be dealt with when the time came to get over. It might furnish us some trout, at any rate; so Guy and Lakenan drew out their lines, while the rest commenced cooking supper. It seemed but a moment before Guy came running back from a driftwood jam a little way up the stream with a dozen fine trout; and during our stay in the cañon we caught so many that we grew fairly tired of them.

Several days were passed pleasantly at this camp, and then we moved three miles up the cañon to the Roaring River, from which place various excursions were made to interesting places about. One day we set about scaling the southern wall, and after six hours of hard and dangerous climbing, at one time crawling on hands and knees along a narrow ledge running across the face of a cliff and squeezing down a narrow crevice to wider quarters, finally reached the top so late in the day that we allowed ourselves but an hour's rest. The return, however, was made in two hours.

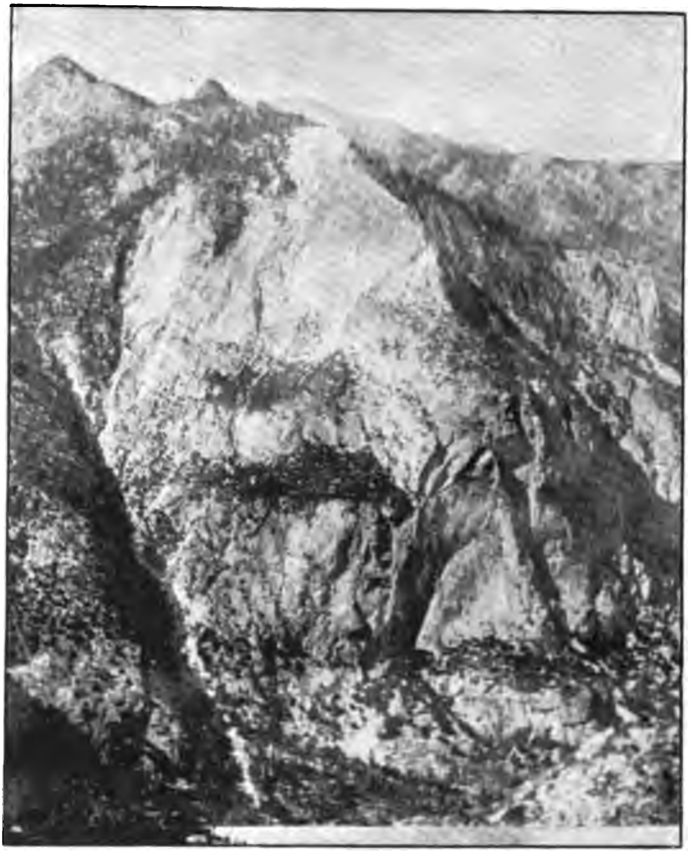
The following day we carried our 450 pounds of food and equipment over the numerous and confused branches of the Roaring River, and pulled the donkeys over afterwards. In the afternoon we went up the south side of the main (King's) river, to a place where a fallen pine spanned the water and where the current was quieter. At this place a week before some sheepmen had lost a valuable pack mule in an endeavor to ford; but it was the only available place for a crossing, so we took all luggage over ourselves, and left the donkeys for the next day.

The river at this point was 150 feet wide, ten feet deep on an average, and running swiftly over an uneven bottom. A great pine-tree reaching clear over served as a footbridge, though horses were sometimes taken over on it. During certain periods of the day the water ran clear of this log, but at three o'clock in the afternoon it began a rapid rise, till at eight in the evening it was flowing over it. Between two and three o'clock, then, the river was at its lowest, so at that time the next day we undertook the passage of the animals. First we tried to lead Roxy across on the log, after disguising it as much as possible with stones and rubbish. It was a failure; so another plan was tried. Carefully tying all the pack ropes together into one long cable, it was stretched along the log, and one end made fast to Roxy's neck. At the other end, two thirds of the way over, Guy stood, while nearer the donkey, with rope in hand, Lakenan and Pheby waited till all was ready. LeConte mounted a conspicuous place, Kodak set, to catch the scene. The boys started; Roxy did n't. I persuaded him, however, with a stout stick, and he waded timidly in. The boys kept on pulling; suddenly the whirling water caught Roxy, and in an instant he disappeared beneath the surface. None of us had expected that; we had calculated that the strong pull from the log would keep his head above water; but it did not, and Roxy went under. The boys on the log stood there completely dumfounded and paralyzed; meanwhile the donkey was being tossed around under the water, in imminent danger of either drowning or of being dashed to death against the sharp bowlders. Then we all recovered our wits. I rushed out to lend a hand, and we ran quickly to the farther bank, and began pulling hastily. In a moment the donkey emerged from the water, — a most forlorn-looking object, but uninjured save that a little patch of skin was gone from one leg. We laughed outright, we were so glad to see him alive and he looked so very funny. As that method seemed rather risky, we tried leading the next one over blindfolded; but it failed, so the rope method was again resorted to with complete success. For now, knowing that if we pulled hard and quickly enough the donkey was bound to come up sometime, if the rope held, we rushed on utterly regardless of his whereabouts till his ears came up, and then we slowed down. Both the others were taken over without trouble, and we felt that now the success of our trip was assured; we had conquered one of the greatest difficulties. There remained another crossing, it was true; but it could only be a repetition of this, we thought. We were mistaken; it was worse.

Some days were passed now in pleasant idleness before we started on a hard and rather hazardous journey, — an attempt to cross the divide between the forks of the King's into the wonderful cañon of the Middle Fork, or the Tehipitee Valley. The Geological Survey, nearly thirty years before, had made a trial with pack animals, but had failed to get over. While in Fresno I had met a man who had been across, but he reported it a difficult task. Fox said that in ordinary years it was practicable, but that, owing to the unprecedented snowfall of the previous winter, it would now be very hard. A miner located in the cañon not only confirmed these stories, but predicted a failure if we should attempt it. In spite of all, LeConte, Pheby, and myself determined to have a try at it anyway; Guy and Lakenan chose to remain in camp.

Concluding to go without any pack animals, we were thus obliged to limit weight strictly. No blankets were carried, as it was our intention to sleep by a fire. Food for about four days was provided. There was one fatal omission, — a compulsory one, however, — of fresh meat. The camera, aneroid, and transit were taken along, but no arms larger than our two pistols. Of two available routes we chose the upper one, which, though crossing at a greater elevation, was shorter and more convenient of access from our camp near the Big Meadow.

Leaving the camp early one morning, we quitted the cañon by the western bank of Copper Creek, and for three or four miles climbed steadily up the northern wall of the great gorge. At last we luckily stumbled into a camp of sheepmen, from whom a small piece of fresh mutton was secured, and who also gave us a few "pointers" as to the route. Going on from their camp along the narrow top of an old moraine till half-past twelve, we rested an hour for lunch, and then resuming the climb, reached at half-past two what we thought was the summit of the divide. We had been above the snowline for some time, — the aneroid showed a rise of five thousand feet, — and yet upon reaching the top, instead of looking down into the Tehipitee, we were confronted by an outlook that almost staggered us. From our feet there stretched away five miles to the north a vast, circular, snow-filled depression,



A PART OF THE TEHIPITEE DIVIDE.

— a granite basin fully five miles in diameter, surrounded, save one low gap to the north, by lofty peaks, from whose steep sides the snow seemed to have been swept into the bottom of the basin. Along the floor a string of icy lakes peeped from beneath snowy mantles, and here and there a granite ledge thrust itself above the almost universal whiteness, or in some wind-swept spot a few scraggy pines stood disconsolate. The lofty peaks, where free from snow, were precipitous and inaccessible; their crest was unbroken, save at the one place far to the north, and to reach that pass it was necessary to traverse the cold fields of snow. But was it worth the hard work and exposure? Did the beauties of Tehipitee justify us in undertaking such a hazardous task?

We were strong and well; we had never measured our endurance against cold and fatigue combined, so we determined to push on. Even if night should overtake us while still in the basin, we could build a fire on one of the protruding ledges. So, clambering down the rim, we skirted the edge of the icy lakes, and walked over treacherous snow and slippery glacier-polished granite, till at half-past four prudence called a halt near a few miserable pines. Upon a narrow ledge rising above frozen fields, we pitched camp, — what little there was to pitch, — and at once set about gathering a supply of firewood for the night. Fred was nearly exhausted, but contrived to help us with several heavy pieces, and then lay down in the sunshine, while LeConte and I continued to drag piece after piece from neighboring trees, over the rough drifts, to our camp. It was arranged in a long pile across the mouth of a triangular niche in the granite, so that it would burn continuously, and so that we might crawl in between the fire and the wall of the niche. It was terribly fatiguing work, but it was either bear up then or freeze later on. At five o'clock — or, as my note-book shows in lead-pencil, 5 hours 21 minutes 11 seconds — an observation for time was made, after which supper was cooked and eaten. Then, as the sun had set and a sudden chill had followed, we huddled around the little fire within the niche and enjoyed the situation.

Gradually the evening wore on, and with the increased darkness came a greater degree of cold, so that between eight and nine the big woodpile was kindled. Strange to say at that altitude where, besides foxes, we had seen no animal life, we were treated to a grand frog chorus, and it sounded very pleasant and homelike. Several hours passed comfortably away in conversation before any one felt sleepy, and then we stowed ourselves away in various positions. It was very well for a short while, but by and by it waxed monotonous; and then came restless shifting from side to side or complete change of position, to get rid of a particularly prominent pebble or to avoid the suffocating smoke. Every nice warm place seemed either to be too warm or it was covered by dense smoke. LeConte tried lying down between the fire and the snow-banks, and seemed to succeed so well that Pheby and I did likewise; but after a half-hour's misery of half roasting and half freezing, we returned to the niche, and I ensconced myself in a warm crevice, where it was very comfortable for a time. Pheby varied the monotony of silence by asking me the time every ten minutes with a regularity that soon became almost as exact as the watch. Most of that miserable night is now but a confused memory of various discomforts. I do not know how it passed, but in some way the hours wore by till just before daybreak we snatched two hours' sleep in the warm ashes. Then an early breakfast was made, the last bit of fresh meat being used, packs were reshouldered, and the way towards Tehipitee resumed. A long tramp over snow and soggy meadows, just peeping from between the drifts, a lively clamber up a narrow gully, and we stood on the ultimate summit of the Great Divide at nine o'clock, July 12. With hardly a pause we began the descent toward the Tehipitee Valley over vast fields of corrugated snow; it was terribly fatiguing, that stepping from snow-ridge to snow-ridge, and in spite of the utmost caution we would occasionally slip and fall into the intervening hollows. Then where hidden rocks reached nearly to the surface there was great danger of breaking through, with imminent peril to legs. Thus stumbling on, it was but a short time before we were glad to climb a high rocky point, both to rest and to look around. And what a noble panorama was revealed to us!

South beyond Granite Basin, beyond the cañon of the South

Fork, rose the noble mass of granite pinnacles of which Mt. Brewer is the culminating point. It rose high above all near companions, its majestic outline thrown in clear relief against the dull sky, its eastern face a sheer precipice of great height. Its base was encircled by vast fields of snow, so that its ascent from the northeast would have been a hard task. A bit of broad surface revealed itself on the northern edge, indicating that an ascent would prove an easy matter from the west. To the north, beyond the cañon of the Middle Fork, the dark red mass of Mt. Goddard was barely recognizable amid the fairly bewildering maze of sky-piercing pinnacles. The Palisades, a 14,000-foot wall unbroken for seventy miles, showed grandly along the northeastern horizon, its majestic columns rising with singular abruptness from a plateau of snow and alpine lakes. To the west and east, nothing more than the white sides of our pass. In all, a wilderness of soul-stirring grandeur and sublimity.

Such was the terrible severity of the surroundings, that for the first time we wavered seriously in our purpose. It had taken us, when in best of condition, six hours to climb out of the South Fork Cañon; how long would it take us, after two or three more sleepless nights and a poor diet of pancakes and bacon, to get out of Tehipitee? We knew of two mountaineers who were seven hours in doing it; and we were wholly unacquainted with the route. It was not worth the risk. We decided to retreat. Eighteen miles lay between us and camp, and they were no ordinary miles. But could we possibly make it that day? It was then ten o'clock. At any rate, we determined to try it. At least it was vitally necessary that we should lose no time in putting Granite Basin behind us; for along the eastern and southern horizons great masses of dome-like clouds had gathered, and we knew that it presaged a storm; and a storm at that altitude, in that particular place, in our tired condition, would have been a serious matter for us. So, pausing only long enough to eat, we started back. The summit passed, we went sliding down on long stretches of snow to the basin bottom once more, and began the race against the approaching storm. Sometimes over smooth stretches we maintained a steady run, but most of the time kept up a fast walk around the protruding bowlders and over treacherous snow-bridges. Once we struck the well-known trail-signs, a pile of pebbles upon a prominent point, and with their aid followed the hidden trail for a time, but soon gave it up, and struck boldly across country to a previously selected landmark which marked that spot whence we had first seen the Granite Basin. Meantime the sky had been darkening; but happily, the storm burst higher up in the range. Our fears at an end, we proceeded leisurely till 12.30, when, to our great joy, Granite Basin was left behind.

After a farewell glance over that ever-memorable region, we started down the 5,000-foot hill towards the Grand Cañon and camp. Few walkers ever made better time than we made that afternoon. Every step, thanks to the steepness and yielding nature of the ground, was of treble length; it was as if we wore those famous Seven League boots of childish memory. Nevertheless we were rather surprised when the Copper Creek Basin was reached, and there remained but three miles of horizontal distance to be covered though over as many thousand feet of vertical. This made it all the easier, however, and we started on the home stretch with renewed vigor. By half-past three the last turn in the trail disclosed camp to our delighted eyes; a loud hollo startled Guy from some culinary operation at the camp-fire and Lakenan from a virtuous spasm of repairs. Their eyes sprung wide open at our appearance, for we must have been rather like apparitions, gaunt and hollow-eyed, with a pallor that showed through the grime and soot of our preceding night's fire. Not a moment was wasted in getting down to work on the dinner, and between answering questions and eating, our mouths were kept busy. The blankets were appreciated that night.

Several days after our return Lakenan, LeConte, and Pheby started very early one morning for the upper cañon of the South Fork. Long after dark they returned, and reported a splendid country traversed, but a hard trip. In an endeavor to make a short cut in returning, they had lost all landmarks, and had even climbed as high as the snow-line, which mistake was probably a piece of good fortune, since it enabled them to learn their whereabouts and to shape a course which finally brought them into camp at eight o'clock. Guy and I had remained in camp, going out at four o'clock, however, after deer; we returned to camp but a few minutes before the others, whose eyes were gladdened by the sight of venison.

On the 17th of July Guy bade us good-bye, as business called him back, and he wished to embrace the chance of travelling in Fox's company, who was to start the next morning for the foothills. On the 18th we moved three miles up the cañon, and spent about half a day in crossing the river just above the mouth of Bubb's Creek. Had it not been for a driftwood jam across the main stream, we should never have succeeded in crossing with so much expedition, if at all. Every bit of baggage was carried across singly before the passage of the burros was attempted. Our ropes were too short to reach clear over; so LeConte stripped to the waist, and wading into the icy water, caught the end, when after several trials I succeeded in throwing it to him. Then Roxy was tied on and pulled through in the usual manner, the others following in their turn.

The following morning we started on a climb towards the summit of the Sierras that lasted two days and a half. The main crest, 12,000 feet in elevation, was reached on July 20; and later in the day a lofty peak just to the north of the pass was ascended. Inasmuch as we were the first persons ever to touch its summit, we named it University Peak. Its latitude was determined, and also its approximate elevation, 13,700 feet. A glimpse of Mt. Whitney, distant in an air-line only fifteen miles, was caught through a rift in the clouds, and we bewailed the hard fate that compelled us to make a detour of seventy miles by way of Independence, when by crossing the Brewer-Tyndall divide twenty miles would have placed us at Whitney's base. But Clarence King had barely been able to cross that divide afoot, — or, one might say, on all fours, — so in our ignorance we were deterred from trying it with pack animals. Later we learned that sheepmen had gone over it more than once, and that, though a slow journey, it was entirely feasible. As it was, we went down the Kearsarge Pass, a 1,000-foot drop with every mile, to Independence, where a month's mail awaited us; thence south twenty miles to a point near Owen's Lake, and from there made up into the mountains again, finally reaching Whitney's base on the 30th of July, eight days from Kearsarge Pass. Once, missing the trail, we were brought suddenly face to face with an insurmountable barrier, a lofty ridge. To learn something of the surrounding country and to locate ourselves, we climbed a prominent peak, and from the top saw that we were but a few miles south of Sheep Mountain, or Old Mt. Whitney, and that farther progress could only be made by retreating ten miles to a low gap at the south. This was done the next day; and the day after we met a cattleman who gave us some general directions, so that two days later we emerged from a confusing maze of pine-covered mountains and "sand-meadows," and saw Whitney, five miles to the east, blocking the end of a deep gorge. At noon the following day we arrived at a camp 3,000 feet below the summit, and remained quiet that afternoon, to make ready for the grand climb. Our camp was just below Professor Langley's old site, and we walked up there and spent a pleasant hour examining the signs of his occupation. The supporting framework of the 400-foot tube was still standing, and there were many things scattered about which spoke plainly of the elaborate preparations they had made.

At four o'clock on the morning of July 31, we rose, swallowed a hasty breakfast, shouldered the various loads, — lunch, water, camera, transit, map, etc., — and at five started up the peak. Were it not for the sublime and ever-changing view revealed with every rise, the climb up Mt. Whitney would be dull. There is no hand and foot work to be done at all; one can walk the whole way. The first rise from Langley's camp is through a rugged gully, which opens upon an extensive bowlder-strewn surface stretching unbrokenly to the summit, where it falls off to the east in a long cliff from 1,000 to 1,600 feet high. At the highest point a cairn has been built on the extreme edge of this cliff, and in its interstices the records of the various ascents are deposited, usually in tin cans. We touched the cairn at eight o'clock, just three hours from the base, and at once held an impromptu celebration over our achievement. We had been told more than once that we should never get to the top, that we would do well even to find the mountain; but in spite of it all we had succeeded, and in fact were the first in 1890 to do so. Subsequently I learned of two parties which failed without even having reached the foot.

Our little jubilee over, we searched the cairn for records, but found very few, — so few that we concluded that many had been either destroyed or carried away ; a conclusion confirmed later when we were told of parties which not only carried away records as mementos, but maliciously threw some over the cliff. Clarence King's name was not found, though we hunted long and eagerly for it. The names of Captain Michaelis and George Davidson of Langley's party were there, and also those of some gentlemen who passed one night on the summit with the former. Before leaving we carefully gathered every scrap of paper visible, and placed them securely in the cairn. Our names and a short account of our trip we placed in a can brought for that purpose from below.

No words can even feebly tell of the matchless grandeur of Mt. Whitney's surroundings; it is a scene of such savage sublimity, with so many sky-piercing peaks rising from deep cañons into eternal snow and stretching away, pinnacle beyond pinnacle, that the eye grows weary in gazing. Tyndall, near at hand to the north, stands a dark sentinel lowering over the gleaming Inyo Valley. From its western side there runs a high and rugged divide, between King's and Kern rivers, to the eastern slope of Mt. Brewer, which was hardly recognizable from this new point of view. From Brewer southward runs the great western ridge with many lofty peaks, but all overtopped by Kaweah, whose snowy heights loom so majestically when seen from the distant San Joaquin plains. At Kaweah the range begins to break down, and from there southward the eye roams over a vast expanse of dark, rolling mountains, till even their outline is lost in the smoky curtain of the Great Valley. To the south an expiring effort at greatness seems to have been made at Sheep Mountain, which almost ranks with Whitney itself; but beyond that the Sierra sinks into insignificance, save where Olancha rises stupendous from forest-covered volcanic ridges. Eastward the eye drops vertically for two miles into the blazing sands of Inyo Valley, or flies across to the barren Inyo Mountains, or beyond into that fearful region of Death Valley and the Devil's Playground.

We remained on the summit nine hours, and during that time experienced no ill effects other than slight sunburns. The direct rays of the sun were almost intolerable, while in the shade it was cold, very cold. We had expected to experience some of the usual discomforts of high altitudes, such as ringing in the ears, hemorrhage, etc.; but beyond a shortness of breath, only felt when moving rapidly, we were free from them all. The descent was made in an hour and fifteen minutes, less than half the time of ascent.

The following five days brought us once more into Owen's River Valley, which was to be our route northward for 120 miles to Mono Lake. Day after day was passed in steady marching over the desert, the miles falling behind with pleasing rapidity; but our provisions were nearly all gone. At noon of the sixth day we were reduced to corn-meal, potatoes, and a little bacon; so Lakenan and I sallied forth in a pouring rain after some ducks in a lagoon close by. They were too wary for us, but Lakenan shot eight killdeer, a small wader no larger than a blackbird. Supper that night consisted of the last can of beef, and two potatoes and a biscuit apiece; leaving for breakfast the killdeer and a little corn-meal with a biscuit each. That eaten, there was nothing to eat save yeast-powder, salt, a scrap of tainted bacon, and a little oat-meal.

With that cheerful outlook we started out the morning of the seventh day to make Mono Lake, where provisions could be had, — by noon if possible; if not, by night. None of us knew how far it was, but we judged that it could not be over twenty miles. All the morning we kept sharp watch for the Mono Craters, which mark the southern approach to the lake; but ten o'clock came, eleven passed, and no craters yet. I was ahead of the rest, anxiously watching for some glimpse of the familiar cones; for I had seen them from the north, and I knew of a cattleman's *rancho* about five miles beyond them. Suddenly, upon emerging from a fine park-like forest, the volcanoes came in sight, and three hours later we were seated in the rancher's house around a table of good things. Afterwards he re-provisioned us with flour at six cents, bacon at twenty, meal at ten, and rice at twelve cents a pound; but considering the distance from markets, that was quite cheap.

By eleven the next day we had reached the upper end of the Tuolumne Meadows, *via* Bloody Cañon, a pass of 11,000 feet, and at three were rounding the base of Mt. Dana. Just there a terrific thunder-storm, accompanied by a heavy fall of rain and hail, came up. Lightning struck all around, — first on the high peaks, and then in the forest about us. Once a tree burst into flame and smoke; and hardly had that report died away, when a blinding flash, a deafening crash, followed quickly by an almost continuous cannonading, startled us terribly. The sky seemed to be falling to pieces, and the forest echoed and re-echoed with the thunderous noise. It passed over in a half-hour, and we went patiently on to the Soda Springs, where we found two other Sierra enthusiasts who had been storm-bound there a week.

A flying trip to the summit of Mt. Conness, where a government party had a summer station, hastened a desire to reach home. On the 18th of August the Yosemite was entered, by way of Cloud's Rest; and after five days' repose and pleasure, the journey was resumed for five days longer by way of Hetch-Hetchy and Lake Eleanor, to Calaveras County, where we disbanded. Nine weeks had been spent in the wilderness, and we had fully carried out our programme save a few minor points. Over 640 miles had been walked, so that we now enjoyed to the uttermost a week's lounging. On the 3d of September, just ten weeks after the start, we reached home.

Ascent of the Organ Mountains, New Mexico.

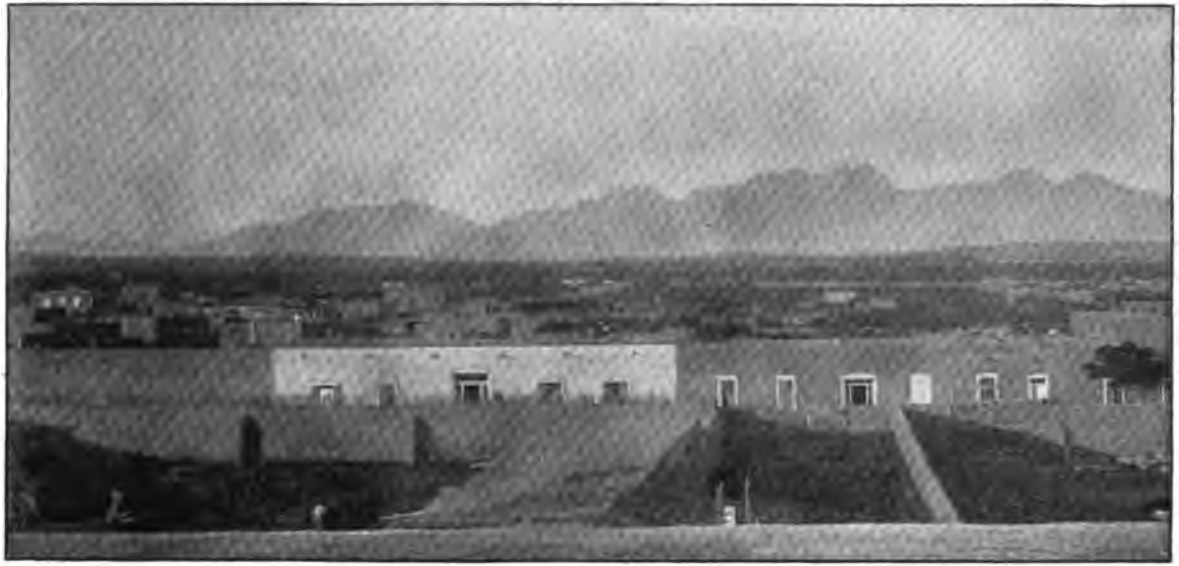
By Charles H. Ames.

Read October 7, 1891.

In the latter part of last May I arrived at El Paso, at the extreme western limit of Texas. My immediate objective point was Las Cruces, about forty miles farther up the Rio

Grande River and in the Territory of New Mexico. Ordinarily the connection is easy by rail; but extraordinary floods had prevailed, and both railway and carriage-road had been washed out so seriously that I was obliged to make a wide detour and to approach Las Cruces from the north. My companion, Mr. B. K. Benson of New Orleans, and I therefore went on northwest by rail by the Southern Pacific to Deming, some fifty or seventy-five miles; then northeast nearly as many more, to Rincon, where we again crossed the Rio Grande to its eastern bank, only to find that on the north as well as on the south approach to Las Cruces by rail was cut off by the turbulent river. There was no way for us but to secure the best conveyance we could and make the forty-mile trip across the desert, — there known as the Jornado del Morte, or the Journey of Death, in grim commemoration of disastrous expeditions across its waterless and treeless expanse in early times.

Around El Paso were mountains of an abrupt and striking character, one range in particular attracting our attention. A long and narrow range came down from the north, and its last cliff seemed from its bold position to threaten to fall upon the town. As we crossed the river and skirted along the bluffs and hills on the western bank, the track climbing higher and higher upon the great mesa or table land, we were aware of the great extent of the first-mentioned range to the northward, and of a portion of the range, apparently some dozen miles in extent, which presented a very striking and peculiar appearance of vertical ribs of stone of great size and regularity, and at once provoking the comparison to organ-pipes; and later on we were interested to know that they bore this very name in both the Spanish and English tongues. The farther we drew away from the river, and the higher and farther we advanced from them upon the mesa-land, the more prominently and remarkably did this perpendicular palisade of massive organ-pipes seem to stand out against the sky. Never had I seen anything like them in any mountain formation. They fascinated me, and I watched them for hours. Early on our journey from Rincon to Las Cruces, the Organs again came into view; and arrived at Las Cruces, we found that the latter place was situated directly west of the Organs, and not more than twelve or



THE ORGAN MOUNTAINS FROM LAS CRUCES, NEW MEXICO.

fifteen miles distant from them. We made many inquiries about them, but were on all hands assured that they had not been climbed, and that they were so bare and steep that it would be quite impossible to get to their summits. This statement itself was enough to beget an intense desire to make the attempt; and three or four days at Las Cruces, in an atmosphere so pure and delightful, and with that wonderful palisade ever before us standing out against the blue and challenging us, were enough to complete our determination to try the ascent. Meanwhile we had made the acquaintance of Professor E. O. Wooton, the young professor of botany in the Agricultural College of the Territory, who wás glad to join us.

Our start from Las Cruces was made on the morning of May 19. Las Cruces itself deserves a word of description. It is an inhabited place, but not a city or a town. It has 2,700 inhabitants, but not a sign of an organization or a government, no mayor or city council, or officers of any sort, not even a policeman. Its inhabitants are chiefly Mexicans, speaking Spanish, showing plainly the Indian cast of countenance, sober, slow, gentle, kindly, and courteous. The houses, with one or two exceptions, are one-story adobes, with walls sixteen or eighteen inches thick, of brown, sun-dried cakes of mud, sun-proof and cool, and "mud all over." Las Cruces is well built for an adobe place; but on the outskirts are many of the Mexican "jacals" (pronounced "hah-káls"), or huts of miserable appearance. Little gardens surrounded by close wattled fences of cactus, to keep out the jack-rabbits and cotton-tails, are abundant.

A few miles of arable land are irrigated by ditches from the one river of the country, the Rio Grande, — originally named the Rio Bravo del Norte, "the fierce river of the North," — at the time of our visit fully justifying its name, raging down its valley, causing vast destruction to railroad and other property, and occasioning our wide detour to reach Las Cruces. The arable land in this part of the valley is a strip some thirty miles long and about three miles wide at Las Cruces.

West of the river, as far as the eye can see, is nothing but a treeless, waterless, sun-smitten desert, covered only by cactus (thirty or forty species of which are recorded, wonderfully beautiful when in flower, as were many species when we were there), the yucca or Spanish bayonet, creosote bush, sage brush, and sand. On the east of Las Cruces extend a dozen miles of mesa, and then — the mountains!

We started at 7.30 o'clock. I was for a much earlier start; but all persuasions failed to stir any one out of the sleepy routine of the place, and we could not get horses or breakfast earlier. Professor Wooton rode a fine pony, while Mr. Benson and I were in a buggy drawn by two good horses. Our saddles were tied on behind.

For days the Organ range had confronted us on the east, like a file of tall sentinels, and challenged us. To-day we accepted the challenge. For many weeks the weather had been absolutely perfect, — the sky of deepest blue, the temperature delightful; such weather as I had read and dreamed of, but never, except once in the Bahama Islands, experienced. The sun had shone down unimpeded, and it had been hot; but I had enjoyed it. In this dry air one hardly ever perspires, — or rather the skin hardly ever becomes moist, no matter how great the toil. Hence, in climbing or other exertion, there was no discomfort.

Straight eastward by a wagon-trail we proceeded across the mesa. A gentle rise for twelve miles brought us to the base of the Organs. There they stood, straight and tall, their sharp needle-like points and spires piercing the blue, looking to be not more than one third of their true distance away. Our starting-point at Las Cruces was said to be 3,800 feet above the level of the sea, and the highest peak of the Organs over 9,000. Our road was fairly good, and we bowled merrily along, shouting to the jack-rabbits and cotton-tails which every minute scurried away on either side. I shot a couple of the former with my rifle, to secure the heads for mounting. One weighed seven pounds ten ounces. Its ears were seven inches long, and its length from ear-tips to heel was thirty-seven inches. Every now and then the beautiful mountain quail, in pairs, would run swiftly out of the path, the peculiar head-plume of the male giving it a striking beauty. A few eagles, crows, buzzards, mocking-birds, and night-hawks completed the list of birds till we got to the cliffs, where we saw a few finches. The absence of animal life in these mountains is striking, and silence one of the characteristics of the region; but the vegetable world presented much that was interesting, and many a specimen found its way into Professor Wooton's botanical case. Often the graceful rider would, in true "plains" fashion, stoop, and without dismounting pluck from the earth some low flower or grass.

As we gradually rose from the cultivated plain, we began to see the yellow flood of the river. It was not, even in the sunlight and from the mountains, a "silver thread." It never lost that ruddy color, due to the enormous quantity of mud it carried. I wished I might know the proportion of solid matter to water, but it must have been amazing. It was literally a raging torrent of thin mud, the like of which I never saw before. Born among the pure snows of the Rocky Mountains, the transformation it undergoes is something astonishing, forced as it is to carry down its enormous load of soil and powdered mountain.

We rode past enormous growths of cactus, some of the species ten feet high, sending out long green snake-like stems, each with a superb scarlet flower at its very tip. Others were full of branches; and others still, the "barrel" cacti, were best described by their name,—huge cylinders or rounded masses like brain coral. Again some species were fine and small,— a tangled mass of horror, for all of every kind are covered with the most terrible of spines. In fact, nearly everything that grows in this desert region is covered with spines,—the mesquite bush, for example, with its great roots, which furnish almost all the firewood of the country. A man goes out here to dig his wood, as a man in Maine goes out to chop his. Then there is the tornia, and every bush is a porcupine ready to resist and punish familiarity. Next to the cactus, the Spanish bayonet and the Maguey plant are most to be feared. Their sharp points are stiff and terrible in their penetrating power, as our bodies and clothing and even our boots abundantly witnessed at close of day. Let a person make but one unguarded grasp at a cactus bush, or careless brush against it, and it will take him hours of painful effort to get out the minute and horrid spines, which detach themselves from the plant and fix their firm hold in the skin; and the savage thrust of the Spanish bayonet and Maguey plant, piercing through the stoutest canvas shooting-jacket, and even the stoutest uppers and sides of the shoes, to say nothing at all of soft woollen trousers, will not soon be forgotten. Even some of the animals are covered with spines,—for example, the gay and mottled lizard, called the "horned toad," numbers of which we saw, together with its sprightlier relatives, the green or brown swifts, which were everywhere plentiful.

We passed up the dry bed of an *arroyo*, or gully, to the foot of a great, vertical, uplifted sheet of rock, precisely similar to those formations which are so well known to visitors to the Garden of the Gods near Colorado Springs. Here were a ranchman's hut and an artificial reservoir of water. Lunch was here divided, and a portion eaten. The horses were taken from the carriage, fed, and saddled; and we were off for the mountains. All the way we had noted an ominous gathering of clouds, which gradually crept up from the west and began to overspread the sky and betoken rain. A few drops fell; but it soon ceased, and we kept on,—the mountain-wall in full view. Through a vast collection of rounded pebbles and bowlders of all sizes we wound our way, and following a path used by the miners in "packing down" on burros sacks of ore from a lead and silver mine above, we attacked the first slopes of the mountains. Far above us they towered, looking wonderfully near; but our more accustomed eyes now scanned them with better judgment, and with a good glass I eagerly studied them to see if a conjecture I had formed some miles back on the Mesa, as to the most hopeful route, would be justified. I have spoken of the fact that I could not in Las Cruces find or hear of any one who had ascended one of these peaks, and I had often been assured that the feat would require at least two days, and would probably prove impossible. The range is reported to be as steep on its eastern side as on the western, on which we were; and it was plain to see that many of the pinnacles were quite inaccessible from our side, being bare and almost perpendicular shafts of stone, running up to a height which seemed nothing less than fearful. There was, however, one line of bushes which seemed to be nearly continuous, and to trend up toward a narrow col between two of the highest peaks, and up this I thought a good climber could possibly scramble; and this proved a correct judgment. The road passed over a ridge, down each side of which and up on the sides of either flanking gulch we could see the lines of stratification of the soft carboniferous strata across the seemingly vertical edges of which we were passing. The Organ peaks beyond were hard granite. Up the steep slope we urged our reluctant horses till we came to the lead and silver mine referred to, beyond which horses could not go. We tethered the horses to some brush, near the piles of glittering ore, and improvising alpenstocks from the stiff and dried blossom-stems of the century plant, we attacked the mountain.

Up we toiled over a spur of one of the high peaks, picking our way around and over the spiny enemies before referred to, now and then stopping to take a look at the widening landscape on the west, and to speculate as to the chance of rain. But the serrated peaks above were still in the blue, and mocking us; and on we went. One of the party attempted a route more to the left, and disappeared around a big boss of rock. It proved an unfortunate move, for he did not rejoin us till near the close of the day, and at nearly the same place. It was doubly unfortunate for the others, for he carried the only canteen of water in the party. I followed my original plan, and Professor Wooton followed me; but as he tarried now and then to secure some coveted flower or plant new to him, I gradually crept away from him, though only once did I get out of ear-shot. Down into a kind of gully, then up, up, we went, through the thickest of thickets, and every step requiring the greatest care on account of cactus and yucca spines. No amount of care availed to prevent many a savage home-thrust. Huge bowlders obstructed the way. In and out and over and among them we crawled and scrambled, oftentimes for some distance crawling flat on the earth or over the tops of the scrub. Most Appalachians know well what good, thick, stubborn "spruce scrub" is, as it covers the northern shoulders and spurs of some of our New Hampshire and Maine mountains. I have had much and intimate acquaintance with it, but must say that I have never encountered any quite equal to the thickets I conquered on the slope of the Organ Mountains that day. Centipedes, tarantulas, and rattlesnakes are found in the country; and I rather expected to encounter some of these, but did not. I had also been shown at Las Cruces a collection of various other poisonous creatures,—among them a frightful insect which exhales a strong odor of vinegar, and an especially repulsive creature called the "niño de la tierra," or "earth baby,"—all of which I was told were very venomous, and assured that for their bite or sting there was no known remedy. All this, no doubt, to make me feel "good and comfortable" during my scramble up the mountain!

One remarkable memory of the ascent is that of the spicy odor which prevailed. I do not know by what plants or flowers it was produced; but it was most marked, and at times almost too strong and pungent for comfort, but generally not unpleasant. I found two species of ferns which were new to me,—one a beautiful silver fern, and the other closely resembling our Woodsia Silvensis, and growing in similar situations. I found also many flowers, several of them of great beauty; but I left their collection to the expert in the rear, and with an occasional exchange of shout or yodel we toiled upward. Many a time the smooth rock, at too steep an angle, compelled a detour; but always I managed to find a way. But now happened the one thing which if possible could make me believe that the gods of these peaks resented my coming and were determined to defeat me if they could, and failing that, to rob me of the enjoyment of my victory. Suddenly the cloud body struck the cliffs, and I was enveloped in mist, and rain began to fall! Still up I went. The rain might cease, and I was too near the summit to give up. Soon I was wet to the skin, and the slippery rocks were very insecure. Flat on my face, and trusting much to the friction of the flat hand against the rocks, I went on. The wind howled, and the rain smote me, and I could not see two rods. Moreover, I was now out of hearing of my friend.

The situation was not without peril. Still I knew I was very, very near to the summit, and I kept on; at last I knew I was at the very top of the ridge. The wind whirled the fog up from the other side, and hurled it in my face, and shrieked at me for coming there, and yelled to me that I should not see one glimpse of the vast prospect beyond. I shouted my cheerful defiance, and then hastily crept down on my own side of the mountain, glad that I could be pretty sure of the right slope, and knowing the terrible peril of the least blundering in this respect. It was some time before I could get an answering shout from my friend; but finally it came, and soon we were together, and making our way slowly back down the mountain. This naturally required far greater care than in going up. The rain pelted us, and the fog whirled in our faces; but down we went. Finally the fog lifted a little, and we saw below us a steep slope of bare rock, and a great abyss below. The whole surrounding looked unfamiliar. Just then we heard a shout far below and to our left. This convinced us that we had veered too far to our right; and back through the scrub and over the bowlders we patiently toiled, tired now, and having to fight for every foot of progress. Down another gulch we let ourselves by bushes and rocks, hearing at intervals the shout of Mr. Benson, only to find ourselves at the head of another chasm which made the nerves ache to contemplate. Back still farther up the gulch we crept; around its head, under an overhanging cliff, whose mass seemed about to fall on us, we toiled. The fog rolled away, but we were in new country and quite astray. It seemed that if we could get around a great spur in front of us there might be a way down on the farther side. After an hour of effort, sometimes rather perilous considering our tired and now unsteady limbs, we got around the peak, only to see below us a gulf far more horrible than any that had confronted us before. There was no help for it. We must go back all that weary way, and try the other flank of the mountain. All this time we could hear Mr. Benson's shout below us. Finally we could with difficulty make out his words. In answer to our anxious inquiry as to whether we could get down the gulch in that direction, we were amazed to hear him assert that we would first better get up to him, since he was above us! We afterwards learned that this was the trick of the remarkable echo and reflection of sounds among the cliffs, for he was far below us all the time. At one time it seemed that from sheer weariness we could not climb back whence we had come, and should have to spend the night on the mountain. But a little rest put new power into our limbs, and we went at it again; and finally, with the peaks above us now all clear and standing mockingly out against the blue, and with a wonderful view of western New Mexico and Arizona and northern Mexico beneath and beyond us, we found ourselves where the accident of the misleading shout had deflected us, and discovered that if we had gone *twenty feet* farther we should have seen our way, and been saved several hours of the hardest kind of work we had ever performed. We clambered down, getting many a stab from the yucca spears, which we had now hardly strength enough to avoid, and finally, rejoining Mr. Benson, we reached our horses and rode down to the carriage by the little ranch in the valley, and were soon bowling rapidly home across the mesa to Las Cruces.

The next day, — ah, that next day! Well, we did not enter for any foot-races, nor attempt to win the prize in climbing a greased pole; but though our joints were stiff and our muscles sore, I for one, as I looked at the great organ-pipes piercing the eastern sky and tried to copy their profile on paper, was glad that I had stood on their highest ridge and proved that they could be ascended, and in one day, from Las Cruces. With my present knowledge it could be done with certainty and comparative ease; but I firmly believe that the ascent is hardly possible save in the place where I accomplished it, and I think the very summits are quite unattainable, for they are sharp and steep shafts of stone, which afford no foothold whatever. The peak to our left as we climbed reminded me constantly of the Aiguille du Dru, in the Alps, as one sees it from the hotel at Montanvert or the Mer de Glace.

From the northern slope of the peak to the south of the ridge which I attained projects, at a remarkable angle, a rectangular mass of rock. This remarkable feature is plainly to be seen by the naked eye as far away as Las Cruces, and is prominent in this sketch of the skyline of the range, which through the kindness of Professor Wooton I am able to present with this article. It is the mass below the little cross.

Since writing the foregoing notes I have received from Professor Wooton a letter written in answer to certain inquiries of mine. It gives not only so many valuable statistics in regard to the Organ range, together with a map of the same, but also such a charming account of his second and entirely successful ascent of the range in good weather, that I venture without his consent to give the greater part of it. I am sure he will forgive me, and that Appalachians will thank me, as his letter contains the only matter in the whole paper which can be said to have any scientific value. I understand that the ascent which he describes was made by the same route which he and I first followed.

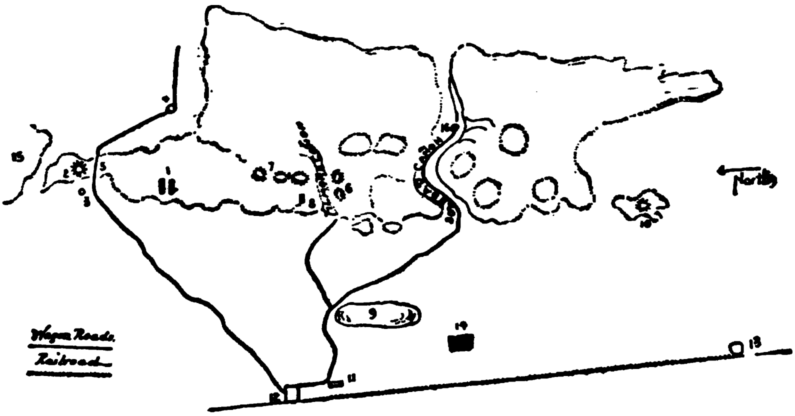
Letter of Professor E. O. Wooton.

LAS CRUCES, N. M., Nov. 28, 1891.

MR. C. H. AMES.

DEAR SIR, — Your favor of November 10 came to hand some days ago. . . . To answer your questions, I can say that the main range which we see from Cruces, and which lies north of Riley's Ranch, is as steep on one side as the other, and is formed of granite and porphyry standing, as one might say, almost on end. The outlying mountains at the foot of this on the west side are of stratified, mostly metamorphosed lime and sand stones, with a dip to the W. S. W. varying from 30° to almost 90°. These stratified rocks in such places, where metamorphosis has not obliterated all forms of fossil life, contain the remains of fossils of the later Carboniferous period as nearly as I could locate them. East of the main peaks, and backing them up as it were, are piles of irregular round-topped mountains, which appear smooth in comparison with the Organ peaks. They extend eastward about eight to ten miles, their greatest length in that direction being through the range at a point a little south of Riley's Ranch. Back in these mountains there is considerably more vegetation than on the western slopes. Lying north of the Organ Mountains is the long chain of the San Andreas Mountains, which is composed of stratified rock tilted up so as to give them a dip of about 45° to the west. The eastern slope is quite precipitous and jagged, while the western is comparatively regular and gradual.

The northernmost peak of the Organs proper is San Augustine Peak, a bare cone about 6,000 feet above sea-level (this is my estimate; I could find no data on the subject). Just south of it is San Augustine Pass, one of the lowest and narrowest places through the range. Perhaps four miles south of the pass on the eastern side the range spreads out about as you see in the rough map I have drawn.



1. Bennett Mines.
2. San Augustine Peak.
3. Organ.
4. San Augustine.
5. San Augustine Pass.
6. Riley's Ranch and the Cueva.
7. Main Organ Peaks.
8. Modoc Mine.
9 A prominent Hill.
10. Bishop's Cap, or Sombrero Peak.
11 Agricultural College.
12. Las Cruces.
13. Earlham.
14. Ruins of old Fort Filmore.
15. Beginning of the San Andreas Range.
16 Isaac's Ranch in Soledad Cañon.

As you observe by the dotted line, I know nothing of the eastern outline except that part south of Soledad Cañon. San Augustine is simply a cattle-ranch belonging to a family by the name of Davies; Organ, a town of about one hundred and fifty inhabitants.

The Bennett and Modoc mines supply a low grade argentiferous galena, with some coatings of copper. The ore is worth from thirty-five to sixty dollars per ton.

The whole range is indented on all sides by cañons large and small, but has only one running through from one side to the other, this being called Soledad Cañon. The southernmost peak of the range visible from Cruces is what is called "Bishop's Cap," or "Sombrero Peak." It is of about the same height as San Augustine Peak. . . . It stands by itself, and the stratification of the rock gives it its peculiar hat-like shape.

The distances are about as follows: From Cruces to Organ, about sixteen miles; from Cruces to Riley's, about twelve miles; from Cruces to mouth of Soledad Cañon, about fifteen miles; from Cruces to Earlham, sixteen miles; from Cruces to Old Fort Fillmore, six miles; from Cruces to Bishop's Cap, seventeen or eighteen miles. As you can see by comparing these distances with the map, I have not correctly drawn some of it. I have been to all of the places named on the map excepting the Bennett mines, so I speak from personal experience. I get my information concerning the southeast side of the range from a fellow-professor, who rode around it one day, travelling about sixty miles on horseback and having no water from 10 A. M. till 8.30 P. M. It was in the month of May, so you may be sure he knows a few things concerning that part of the world which he will not soon forget.

From the crotch in the top of the range to which we ascended, we got an excellent view. We could see to our west the Sierra Madelinas, about forty miles away, and beyond these other ranges, ridge beyond ridge, until they were only bluish white streaks. We could also see the El Paso Mountains to the south of us, forty miles away; a range about twelve miles south of the line, over in Old Mexico, to the southwest; to the eastward the Sacramento Mountains, about sixty or seventy miles away. To the northeast were the Sierra Blancas,[1] about eighty or ninety miles distant. (I have seen this, when snow-capped, from the ranch at San Augustine.) Lying apparently just under the Sierra Blancas were the "White Sands," a plain of low gypsum hills, about thirty miles long and five miles wide, eighteen miles from San Augustine. To the north lay the San Andreas range; close to us and away to the northwest the Sierra Caballo, about eighty miles away; on the horizon were the peaks of the Black range, 150 miles distant. We could not see the Guadalupe Mountains (to our southeast) on account of the main peak which lay in that direction, and which we could not get beneath our feet. It was a grand picture. . . . Plains of a green-

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[1] Not the Colorado peaks of that name. — ED.

ish-brown near at hand, fading away into the level flat gray color, bounded on the edge by those deep cloudy blue ranges with their points reaching towards the clear blue sky above; while winding along in plain view, with its many turns and twists, now appearing, now disappearing, ran the Rio Grande. . . . It was especially pleasant to look on all this beauty spread at one's feet, and feel the warm pleasant sunshine, and hear the breeze whispering in the pines which grew in the clefts of the rock near us. We were loath to leave, but had to hurry down to get to camp before dark. Yes, we omitted that "extra fourteen miles" (as you put it that day), and after a rapid scramble reached our horses, and from there on down to water and camp. I shall never forget the trip so long as I live, and thought all the way up how much you would have enjoyed it. . . .

Very truly yours, E. O. Wooton.

Mount Passaconaway.

By Charles E. Fay.

Read October 7, 1891.

The Sandwich range, to one approaching the White Mountains from the south, — the usual direction, — stands as a dark rampart, behind which, their presence less discerned than suggested by here and there an overpeering distant summit, a whole army of mountains is assembled in half-orderly confusion. From the heavy outlying spur of Black Mountain on the west, it runs with strongly accentuated profile northeasterly to a culmination in Passaconaway; then, turning due east, it extends perhaps half as far, ending in the Hammond ridge of Mt. Chocorua, — in all a mountain wall of some twenty miles in length.

Considered topographically, as divided by its lowest depressions, the range is made up of three distinct masses, and comprehends much more than is usually grouped under its name. The easternmost embraces Chocorua and Paugus; there is no deep depression in the ridge uniting these peaks. Just west of Paugus, however, there is a low pass over to the Swift River valley. Out of this depth springs Passaconaway, to begin the second, or Passaconaway-Whiteface-Tripyramid group, — for these peaks are but culminations upon the same lofty, continuous ridge. From the summit of Passaconaway there is a steep fall to the westward of perhaps 700 feet, against some 1,700 feet on the eastern side; from this *col* the ridge, turning southwest, rises gradually, with a few intermediate minor summits, to culminate anew in Whiteface. Again falling away to the west, possibly 800 feet, the ridge suddenly turns northward, and rising once more, passes in two great convex swells with slight depressions to spring to its maximum elevation in the peaks of Tripyramid, — seldom thought of as forming a part of the Sandwich range; trending northwesterly from the north peak of Tripyramid, the ridge continues a little distance still, and finally ends with the sudden descent of Kancamagus into the Mad River Notch. The third and westernmost mass of the Sandwich range comprehends Black Mountain and its outliers.

Sailing the bright waters of Lake Winnipesaukee, the tourist sees now one portion, now another, of these wooded masses closing the vistas of long bays, now a spur and now a peak; there Chocorua, soaring ever light and graceful with sheeny head, — strange that the solid granite can seem so imponderable! — here Passaconaway, gloomy and ponderous, as the convex outline of its dusky dome rolls upward to form the apparently highest point of the range. Densely wooded with spruce to its very top, it seems darker than its fellows. In my youth it seemed to me of massive iron.

Of these two most impressive peaks, the majority would doubtless accord the prestige to Chocorua. No one can resist its weird fascination, its superb outline, its legend-crowned spire. Yet Passaconaway surpasses it in altitude by nearly 600 feet, and until the present season possessed for mountain-lovers an added title to their regard, — the interest which attaches to the unknown. Despite its seeming inaccessibility, Chocorua has for some years been the goal of ambitious climbers. Latterly, since rough places have been made plain and others, that formerly called for a little nerve, have been shorn of their terrors by staircase and hand-rail, the numbers annually attaining its desecrated summit must amount to hundreds. By another summer mountain wagons will probably be discharging their freight at the door of a hotel erected just below that matchless cone.

Until the summer of 1891 Passaconaway was an almost unvisited peak. It may be doubted whether a score of persons had ever found their way to its summit. That it furnished the principal field of activity for the Club's department of Improvements during the past season seems to render an article upon it timely, and I find myself summoned to be the scribe. Yet in undertaking to tell the recent story of Passaconaway, two sentiments contend for the mastery. Was it justifiable to love the mountain not less, but climbers more? As one of the limited number to whom its secrets had been revealed, was it or not a breach of confidence to plan for the wholesale invasion of its privacy, and to aid in making it a readily accessible peak, at least for such as are willing to do their own mountain climbing?

My acquaintance with the mountain dates from the year 1876, that in which the Appalachian Club was founded. The sonorous name had been familiar to me from an earlier date, but as applied to a different mountain. Tripyramid is the original Passaconaway; the name will be found so applied on Walling's Map of Grafton County. The peak now bearing, and destined doubtless ever to bear, this grander title was then North Whiteface. It was commendable, when Professor Guyot had adopted the characteristic name of Tripyramid for the Waterville mountain with its three peaks of almost equal height, to give it the sanction of official recognition, and to transfer the name of the wise and good chief of the Pennacooks to a single and remarkably individual summit, that bore as yet no really distinctive name. The only pity of it is that it was felt necessary to preserve the worthless title "North Whiteface," transferring it to the wooded summit which forms the actual culmination of Whiteface, only a few hundred yards north of the bare rock-peak usually ascended and generally supposed to be the highest point, which moreover was occupied in 1876 as a station by the United States Coast Survey in its work of triangulation. The name has surely no claim to perpetuity.

My first visit to Passaconaway was made during the occupancy of the peak by the Survey party. Chancing to be on the summit one day when the observer in charge desired to have a signal set upon the great forest-covered peak in an air-line only three miles away, I gladly volunteered to accompany one of the assistants across the ridge upon that errand. It must have been about two o'clock in the afternoon when we started. An excellent path, now nearly obliterated, yet possible to follow, brought us speedily through the slight intermediate *col* to the just mentioned highest summit. From here on it was unbroken forest. To our enthusiasm the way seemed easy through the mossy woods, and by keeping the crest we avoided the difficult skirting of precipitous rocks, so that we could scarcely have been two hours in traversing the ridge and scaling the steep westerly slope to Passaconaway's summit. The actually highest point was not so easy to determine; for beside being quite densely timbered, the top is a roughly elliptical plateau, the longer east and west axis measuring some four to five hundred feet, the shorter possibly half as much. The largest of the trees are nearly forty feet high, so that at that time absolutely no view could be had from the summit. Mr. Smith selected for his signal the sturdiest available spruce a few rods east of the actually highest point, climbed up and trimmed away the upper branches for the space of three or four feet, and here wound the trunk with black and white cambric. It was interesting this summer to point out the same tree, minus its drapery, to children then unborn.

Is it because it was so long ago, or because in those days I had not acquired the power of observation of topographical features for which, so far as it exists, I am indebted to this Club, that it is impossible to make my recollection of our descent tally with what recent repeated visits have made the familiar topography of Passaconaway? I clearly recall that after the signal was completed and I had come down from the tree climbed to secure a lookout, we decided not to retrace our steps, but to strike for home by a southerly course. Then follows a somewhat hazy recollection of a descent rather steep at first, then of "slabbing" a ridge, of reaching the bed of the ravine, and following a seemingly endless brook, of coming out at dusk into a clearing, and then striking across country through open and timber, and finally some time after dark reaching the hospitable lights of the McCrillis farm. But which ridge, which brook, what clearing, I find it impossible to decide. It is one of those cases where if one knew less he would be more certain. My general impression of direction taken in starting and length of time in making McCrillis's would suggest that we came down into the ravine by a course similar to that followed in my first visit of this summer, but struck civilization on Mr. Tewksbury's farm.

My next ascent was made in the summer of 1881, this time in company with Messrs. W. H. Pickering and Astley Atkins. We had walked the afternoon before from Conway up the Swift River valley to Shackford's. Our route to Passaconaway was around a rough foot-hill; then up the mountain's easy, finely timbered north slope to the summit; thence over the ridge to Whiteface, retracing the course of five years before. Mr. Pickering has described this trip in APPALACHIA.[1] His description of the rainy afternoon's work is accurate. The dolefulness of the dripping woods will account for the large overestimate of the distance between the two peaks.

Whether because "first impressions are strongest," and mine gained on that pleasant summer afternoon with the sunlight sifted through the boughs on moss and oxalis effaced the later one, or for some other reason, I had always thought of the forest along this ridge as particularly fine and easy to traverse. Hence it was that I had no hesitation, while sojourning in Tamworth last summer, in forming a party containing ladies and children to repeat the excursion of 1876, to be rendered far easier, at least in the planning, by a night's camping on the way. One of my pleasantest memories of that first trip was of a pretty rill that came speeding down the steep slope of Passaconaway, right out upon the *col;* here timidly checking its course like a child that has half lost its way, it ran a short distance along the crest of the ridge, then turned suddenly and sped on its new-found path down towards the Swift River. By this copious water-supply we would pitch our camp for that intervening night, and rising early, greet the rising sun from the high summit. *Dis aliter visum.*

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[1] Vol. iii. p. 72.

Ten of us, including our two woodsmen or porters, formed the party that took the stage on the morning of August 7 to ride to Whiteface Intervale. The morning was hot but fair, and we counted on a rare view from Whiteface; but before we were half-way up, a thunder-shower suddenly appeared from over the mountain, — the first of a series of down-pours that tried in vain to dampen our ardor during the day. The upper portion of the path, formerly so good, is now sadly in need of bushing out, and against the contributions of the dripping spruces our waterproofs were quite useless; we reached the summit thoroughly drenched. The very intermittent character of the view through opening and closing mists accorded ample time for the task — fruitless, as it proved — of drying off by a meagre fire under the lee of a rock. By the time we were compelled to set out over the ridge, we were again in the midst of a driving rain.

Before the clouds finally shut down, we had taken occasion to scan with some care our proposed course. We had heard of the great devastation wrought by a cyclone in 1881, not many weeks after my second visit. It had swept from the north directly over the westerly slopes of Passaconaway, laying waste hundreds of acres of the forest; crossing the ridge, it had rushed down into the broad basin between the two mountains, though here the growth of the intervening ten years had served to conceal the fallen forms of the giants that had gone down before it. On the northerly slopes and along the crest of high ridges whitening trunks of spruce and pine at every angle and in every posture bore testimony to its cruel power. One unpromising arm of the wreckage lay visibly across our path for the morrow, and we were able to determine in advance the narrowest place to make our crossing. Had the whole situation been revealed to us, I think we should have hesitated to go forward.

Stopping for a moment to look into the dreary little brush camp at the northern end of this summit, we struck into the wet thicket, — at first by the almost obliterated trail, which in a few moments entirely failed us. It soon became evident that skirts were not ideal apparel for such a tangle, especially in rainy weather; and our progress was very slow. Again, being diverted from our intention to keep the crest by fallen timber at the point where we tried to get upon that highest summit of Whiteface, — a later trip showed that it would have been wholly feasible if attacked at another point, — we were compelled to skirt along the steep, moss-covered rocks and ledges that form a kind of rude escarpment just below the crest. After three hours' tedious progress we had accomplished but little more than half the ridge; and the lateness of the hour admonished us to change our plan, strike down at once to running water, and prepare our camp. The storm had now ceased, and there was promise of a fair night and glorious morrow.

Though the spongy moss beneath our feet gave promise of speedily reaching a descending rill, we came down the slope several hundred yards before we found an available spot, just where a little stream, gushing from under the rocks, assumed the occupancy of a rocky run which we had followed some little way. At this point it furnished a most convenient fountain and washbowl; and just at hand was a small level place, with convenient building material, and fuel for our fire. We had reached here none too soon. Twilight was upon us. A good fire was soon blazing at the foot of a mighty spruce, and lesser trees were already falling under the diligent axe of Melvin Kimball, of Tamworth, who has in him the making of a perfect guide. This was his first experience of the sort. In less than an hour, by what remained of daylight and the illumination of our camp-fire, he had built with Davis's aid a lodge ample for our entire party, and so substantial that, passing that way nearly a month later, I found it as perfect a shelter for another night. After a bountiful supper we dried by our camp-fire the boughs of ground hemlock, that we then stripped and carefully laid for our bedding, yielding as tribute to the flames the refuse ends and branches. How they filled the forest with their glare as they burst into flame! And how our fire blazed and glowed all night long in response to the liberal offering of our guides! Comforting, lulling even, is the sound of the axe felling the dead "stubs" at midnight out in the edge of the gloom, — a sound that will recur to all who shared the bounty of that camp so long as memory lasts. The presence of our younger members of the party — a girl of thirteen and a boy of nine, delighted with the novel experiences — heightened the general enjoyment of that rare night.

Our plan for seeing the sun rise from the peak of Passaconaway had been abandoned with our changed plan for camping. From our camp we saw it rise over the southerly spur, and promised ourselves that we would reach the summit by ten o'clock. Again we had counted without our host, — this time the host of fallen trees fearfully entangled with the young growth, spruce, birch, wild-cherry, to say nothing of raspberry vines, whose luscious fruit proved almost as much a source of detention as the "jackstraws" themselves. The green overgrowth had hidden it from our sight when on Whiteface. Into this we plunged shortly after getting underway. For men it was bad enough; for ladies, infinitely worse; the children rather liked it. Even with the help of Kimball's tireless axe, our advance was foot by foot. Two hours were spent in traversing a distance which normally should not have taken ten minutes. We passed below the point where we had counted upon camping; but it was evidently only a ruin. The brooklet itself is very likely diverted from its course by the "blow-down."

It was considerably past noon when, after having spent nearly an hour in crossing the second "jackstraws" at the point selected the day before, we halted for luncheon at the summit of a southerly shoulder of Passaconaway, separated from the main mass of the mountain by a slight depression. This hollow is completely filled with the wreck of the cyclone; and the dread of crossing it had forced us from a direct course easterly along a difficult yet most interesting ridge, with wild scenery of cliffs and shattered moss-grown fragments in the gloom of the spruces. The point we had now attained we were destined to know more pleasantly afterward. It is the site of "Passaconaway Lodge," the new A. M. C. camp. That day it was an unpromising spot indeed, just on the edge of the "blow-down;" but the grand view it afforded of Chocorua, with hints of broad prospects between the trees, living and dead, gave it even then an interest.

For myself, I did not feel so hungry for luncheon as for the summit and a successful issue of our undertaking. While the others discussed sandwiches and the abandonment of our plan, I made a trial of the "jackstraws" that still lay between us and the final slope to the summit, now lying due north and tantalizingly near. In ten minutes I had succeeded in effecting a crossing and return, and to my great joy had found upon its farther limit what surely would prove an irresistible argument to persuade the others to cross. They were making a dry luncheon, while just over there flowed a clear stream of ice-cold water. Twenty minutes later they were dipping from its full supply, and in a few minutes more four of us — including a youthful representative of the sex that never yet had set foot on Passaconaway — were dashing up the final slope to win success for the party. In twenty minutes we were upon the summit, enjoying the superb view now afforded from the easterly end. Here, in recent years, a ledge, formerly covered with small spruces, has been cleared by Mr. Frank Bolles, a summer resident beside Chocorua Lake, one whose love of wild nature has now and then led him to this secluded spot. A panorama is here opened of nearly 180 degrees, extending from the easterly slopes of Mt. Carrigain to Mt. Shaw of the Ossipee Mountains. Mt. Willey, with the Notch, Mt. Washington, the Carter range, and the peaks about Jackson and North Conway are among the most prominent mountains in the view, besides a host in Maine, clear around to Agamenticus by the sea. In the superb atmosphere of that day their array was magnificent. We should have been much comforted, as we tore ourselves away after an all too short enjoyment of the scene, had we known that we were destined to enjoy it more than once again that same season, with the gorgeous decorations of sunrise and sunset splendor. Rejoining our companions after an hour's absence, we began our descent; yet, owing to the lateness of the hour (it was now three o'clock), not by the route originally proposed.

And here in the interest of later narration it is necessary to speak more fully of the topographical detail of the southern side of Passaconaway. While due east it falls, as has been said, with sudden slope into a profound valley, it sends out southeasterly — really from the high shoulder upon which we had lunched — a short spur, perhaps three fourths of a mile in length, rising slightly from the level to which the shoulder descends most precipitously some two or three hundred feet. The highest point of this spur appears as a summit from some directions, and is indicated as such on the Club's map of the White Mountains, and given an elevation of 3,402 feet, something more than seven hundred feet less than the high summit. This spur drops suddenly off on the east side also perhaps four hundred feet into a deep sag, from which one climbs again almost as much to the crest of a long ridge with a general northeast-southwest trend, at the southerly end of which stands the symmetrical mound called Wonalancet.[1] Now downwards towards Wonalancet there sweeps from the summit of Whiteface an easterly spur, so that, embraced by this spur, the ridge we had traversed, and the ridges we have just described, there lies a great basin, the upper watershed of the west branch of that lesser "Swift River" which flows through Tamworth Village, and whose east branch heads between Paugus and Chocorua. This basin is itself divided, primarily by a ridge running south from the base of the western pitch of Passaconaway. The two streams formed in the two sections thus made, meet at the ending of this ridge, under the westerly slope of Wonalancet. Just above this confluence is the ruin of a deserted saw-mill and of the simple habitations its brief existence had called into being. This is "Dicy's."

It had been our intention to traverse this Wonalancet ridge, and descend from it directly to Birch Intervale. A later experience proved that we did wisely in abandoning that plan, and striking directly down the very steep side of the mountain, through a thick-set undergrowth of small spruces growing among the high timber, into the ravine east of the dividing ridge just mentioned. In its bottom we had every reason to expect to find a logging-road. And so we did; but such a logging-road! Much of the high timber had been cut away on either hand, but so long since that the whole had been almost entirely reclaimed by Nature. To discover and follow the overgrown road offered difficulties comparable with those of the "jackstraw" region, at least to the pioneers of the party. Here again the profusion of luscious raspberries, of which we saw that day scores of bushels wasting for lack of pickers, proved a solace and detention, so that it was six o'clock before we reached "Dicy's." From here, to our great satisfaction, we found a grass-grown road,—after what we had passed through, it seemed as smooth as a macadamized avenue,—by which, in about three quarters of an hour, we reached the farms of Birch Intervale.

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[1] This name should by good rights be extended to the entire ridge, which has three summits higher than the one monopolizing so fine a name; for the whole might easily pass for a single mountain.

Perhaps, if Nature herself had not begun the work of desecrating Passaconaway, we should never have thought of asking the Department of Improvements for an appropriation to open it to travel. The interesting way over the sylvan ridge would have seemed all-sufficient, had it not been so abominably disfigured and obstructed. Moreover, finding so good a road leading from the farms almost to the base of the mountain, which would render the ascent feasible in a single day from Tamworth, was an additional incentive. A ready response was made to a proposition to lay out a trail and build a camp, and measures were immediately taken to put the plan into execution.

First, a reconnoissance was made to determine the best route. How dense ignorance appears against the bright background of later knowledge! How preposterous it seems today that it could have been supposed a desirable way to approach Passaconaway by logging-roads beginning over near the base of Chocorua! Being suggested however from a quarter demanding respectful attention, the route had to be investigated. The party consisted of the appointed agent of the Club with two competent woodsmen, Messrs. "Nat" Berry and "Ned" Staples, the latter a hunter, and one of the few residents who had up to that time ever stood on Passaconaway. Mr. N. H. Whittemore and Dr. J. S. Thorndike, boarding at Mr. Berry's, joined as volunteers. It was nine o'clock of a terribly hot, humid day that we started in by the logging-road that, beginning at Berry's, passes along under the southern end of Paugus. The night before it had rained in torrents; the brooks were dashing on, it seemed to us as if increased by our own sudatory contribution. At one o'clock, after much labor, involving the climbing of a high intervening ridge and crossing a "jackstraw" region, we were lunching in a sag to the east of the northerly end of the Wonalancet ridge, — a point which we might easily have reached in half the time from Birch Intervale. From here we passed around to the north side of what is there known as "Hedgehog," and came slowly up the northeasterly slope of the short steep spur before mentioned, to find ourselves at its top in a wilderness of fallen timber, so that it was seven o'clock in the evening before we reached the point where the majority of the preceding party had waited for the others while they climbed the peak. Here a temporary shelter was built, and a hard-earned meal enjoyed. If any one fell asleep that night, he did not get a chance to report it, for some one else always had the floor. There was not a five minutes' pause in the conversation all night long. Every bear story, true or imaginary, ever told in Tamworth was repeated with variations. Daylight, therefore, found the party ready to proceed to the summit, where two hours of excellent work were put in by our axemen. An excellent outlook, corresponding to that already mentioned, was cut at the west end of the summit ridge, opening the view from Mt. Washington to Black Mountain (Sandwich). Carrigain is superb from here, with its most striking Notch; Garfield and the Lafayette range, Kinsman, the Osceola-Tecumseh range are also prominent, and just over the ravine of Sabbaday Brook rise the peaks of Tripyramid. Between Tripyramid and Black several remote Vermont peaks are seen. In the foreground is the upper Swift river valley, beyond which rises Green's Cliff with its long escarpment of rock, like a citadel in an enchanted wood. An attempt was also made to open the superb southward view; but, as it was found to involve too much labor and ruthless destruction of fine trees, a tall spruce with branches conveniently set for climbing was rendered accessible by an improvised ladder. From its top an incomparable panorama was revealed. Trails were "spotted" from one view-point to another; and as we descended to our camp, the carefully chosen path was also plentifully blazed.

Another object of this visit was to test the route over the Wonalancet ridge, which, as apparently the most direct of all, had gained my suffrage. The way, however, proved difficult, first, by reason of the character of the growth and many windfalls on the southerly side of the short spur, though our men blazed a trail to its end; again, we had not anticipated the deep sag between it and the Wonalancet ridge, nor the length of that ridge itself, covered on the east side with an exquisite growth of young hard-wood trees, five to ten inches in diameter, — paper-birch, yellow birch, maple, and beech, — especially long when followed out by a gradually descending course. We were at least five hours in reaching Birch Intervale from our camp, all the time mercilessly persecuted by a late crop of black flies, for it was the third week in August. Our reconnoissance had proven two negatives; and one affirmative was the result, to wit, that the true approach of the Club trail was from Dicy's Mill.

And now a new and pleasant partnership in the work of rendering Passaconaway accessible was suggested from an unexpected quarter. The owner of "Wonalancet Farm," ever mindful of the interests of those with whom she has cast in her lot, had come to the conclusion that Birch Intervale could improve its condition by becoming more attractive to summer visitors, and invited Mr. William H. Ladd and myself, in our office of members of this Club, to meet and address a company of the residents at her house. Such an opportunity to do missionary work for the Club idea was not to be lost. Mr. Ladd clearly set forth what had been done in other lands by public action or combined private energy, leaving it to his successor to show what the farmers of Birch Intervale might do for that place: first, to make it the easy point of departure for visitors to Passaconaway; then to resolve themselves into a local association for new improvements and the maintenance of old ones, which should at the same time be a source of intellectual enjoyment in the long winter season. Mr. Ladd made so strong an impression that these suggestions were cordially entertained. Promises were made that the logging-road to "Dicy's" should be transformed into a comfortable wagon-road, and that a good foot-path should be made from there to the camp which the Club had undertaken to build. This would be a great advance upon the original scheme, which contemplated only a "spotted" trail.

It was an enthusiastic body of men who met a few days later and proceeded to the old mill to inspect a route for the new path. Some of them had logged in this basin in the heart of winter, and possibly had never seen it save under four or five feet of snow; possibly not one of them had stood on the high summit to which their steps were now turned. Their knowledge of the timber and the old logging-roads, however, was extensive, and it was at once suggested that instead of keeping up the ravine, reversing the route of our party in descending a few weeks before, it would be better to begin climbing at once along the easterly slope of the long south spur that ends at "Dicy's." Crossing the stream, we at once entered upon an ascending logging-road. To the surprise of all, its lower part was little obstructed by windfalls, and it was evident that a bush-scythe would quickly convert it into a broad, easy path for nearly a mile, during which a rapid rise is made. Shortly before reaching the top of the ridge, the party took to the woods, and blazed a trail just below the crest and by generally easy gradients to the junction of the spur with the principal ridge, then approximately by the route followed by our earlier party to the point where we had halted to lunch. Then we crossed the "blow-down," and went on to the summit. It would have inspired afresh the most *blasé* climber of mountains to have witnessed the enthusiasm over the extent, variety, and beauty of the view. Descending, the same route was taken, and Birch Intervale was easily reached before sunset. It was evident that with a path Passaconaway was to be a comfortable one day's trip for such as had no more time to devote to it.

The new enterprise only gained by that day's experience.

A few weeks later found the promised path completed.[1] Another season will no doubt see a carriage-road as far as "Dicy's." May no season ever see it carried farther; for whoever would not prefer to go from there to the summit by his own effort is not worthy to set foot on Passaconaway. And long may the summit retain its beautiful growth! To build a rustic look-out that would overtop the trees would cost very little more than to fell the large acreage that would be requisite to clear so large a summit.

Twice more I had occasion to visit the summit, in September: the first time, a visit of two days, to locate and build the camp; a second visit to clear up the ground about it, and enjoy its hospitality. On the first occasion we reached the mountain too late to do more than construct a temporary camp at the point where we had planned to erect the permanent structure, very near to where the first reconnoitring party had passed the night. Experience proved the location unfavorable, the slope being too steep for comfort and bringing the camp-fire too low to be effective. The next morning, after an hour or two of preliminary scouting, our original lunching-place was found to be the most available spot. The master workman was Onslow Ross, of Tamworth; Davis, of our first party, assisted in the heavier work; the ladies and children cut hemlock sprays, and carefully arranged the floor. None of us had ever built a lodge before; but what one did not know another could guess, and when done it seemed to us "good," both from the utilitarian and æsthetic point of view.

It measures nine by fourteen feet on the ground, is seven feet high at the open front, and three at the back. Back and ends are built up of unpeeled logs; the east end, however, only as high as the back. The triangular space remaining is partly arranged as a window. What was not needed for this purpose is closed with rustic work; spruce trunks a few inches in diameter were split, the halves cut to the proper lengths, and these nailed on vertically, with bark outward. The rough inner side was then concealed by a tapestry of birch bark. Sprays from the thatch of spruce boughs droop over the upper edge of this window, and in it is framed for those who sit within the lodge, as a matchless picture, the superb form of Chocorua. Due east, it is at its best at sunset.

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[1] Its builders were D. Q. Tilton, I. B. Tilton,* E. G. Tilton, T. Wiggin,* H. Wiggin, J. Gilman, F. B. Currier,* N. Berry, N. Dillaway, F. Bickford, N. Bickford, and by proxy, H. Currier and the Wonalancet Farm.* Those marked with an asterisk and H. Tewksbury made the original survey for the path.

In the last visit measures were taken to make the most of our fine location. Our operations had made some havoc; the rubbish must be cleared away, and an effort made to convert the place into a wild park. The situation is at the very edge of the "blow-down;" enough fuel is at hand for years, — for scores of years, if it does not meantime decay. This occupies the depression behind the camp and on the east side; but dead trees were also standing among the living ones in front of it. Most of these were cut down and dragged away, while judicious cuttings were made among the living trees, opening vistas with beautiful prospects. The lodge faces south. Sitting within it, through one of those openings you may see Squam Lake in the middle ground, and over it, far-away Monadnock and its neighbors. Through the next you see in the immediate foreground the profound wooded ravine in all its length, over Wonalancet the farms and villages of Tamworth, Sandwich, and Moultonborough, the great peninsula of Moultonborough Neck reaching out into the "Broad" of Lake Winnipesaukee; beyond the lake, Gunstock and much remoter the Uncanoonucs. Then, from an outlook a few rods away, there is a complete sweep of the horizon from the Southern to the Northern Kearsarge, about half of the entire circle. Mt. Wachusett is the remotest peak visible. The lodge is at almost exactly the same height as the summit of Chocorua. The view southward from it is equally extended.

The sun was flooding all this with evening glory as we finished our work. Suddenly voices were heard below us — young voices, sounding strangely at that hour — out of the shadowy woods. Soon we were joined by a party of four, three feminine, two of them hardly in their teens, who had been unable to resist the temptation to come up, following the blazes, and pass the first night in the completed camp. And what a night! First, before the harvest moon arose, we lighted the enormous pile of rubbish which we had collected.

the hotel and looks about him with his face to the west, finds himself on the east side and near the northern end of a small clearing in the middle of a valley six or seven miles long by two or three wide, closed at its southern end by the huge mass of Black Mountain, and at the north by the still finer peaks of Mt. Osceola, and flanked on east and west by the summits and ridges of Snow's Mountain and Mt. Tecumseh. Below him lies the hotel; to right and left on the low ridge where he is, stand three fine cottages; in the valley below him are four more; over by the woods is the bowling-alley; while down the road is the inevitable school-house. All else is wood and stream and glorious mountain air.

If now we don our tramping costume and, taking to the woods, follow up the streams, or, better still, climb to the summit of Mt. Osceola, we determine the extent and shape of the rest of our valley. A short distance above the hotel it turns rather sharply to the east, and immediately divides. The wider part bears to the southeast, and runs off to lose itself against the steep westerly flanks of the Tripyramids. The narrower part turns back a little to the north for a mile or more, and then, turning sharply to the left, runs into the fine mountain pass known as the Mad River Notch, which lies between Mts. Osceola and Kancamagus.

The whole valley then is really a bowl-like depression, with a diameter of about six miles, around the rim of which, going from north around by the east, stand the following: Mt. Osceola with its two peaks, Kancamagus with its five rounded and crowded summits, the four peaks of the Tripyramids, the confused mass of doubtful name and still more doubtful topography in the triangular space between the South Tripyramid, Whiteface and Black Mountain, Black Mountain itself with its outlying spurs, and finally Mt. Tecumseh closing the circuit. But the symmetry of this bowl is broken by two projections thrust from the surrounding wall toward the centre. From the southeast comes forward fully to the centre of the bowl the large ridge of which Snow's Mountain forms the crest; while from the low fourth, or northwestern peak of the Tripyramids runs a long ridge ending in "The Scaur," between Slide brook and Flume brook.

This valley was entered, I do not know how many years ago, and clearings made in three places,—one about the hotel, a second at the point marked Swaseytown, a third at Beckytown. The last two have long since been abandoned to the forest, which has nearly reclaimed them, and which has also within the writer's knowledge made large inroads on the clearing about the hotel.

So much for a cursory description of the topographical features of the valley. As to the reasons that might induce one to visit it, or the pleasures he might expect, they are manifold. In the first place it is retired. It is ten miles down a narrow valley to the nearest railroad, and there is no other possible approach except through the woods and over the mountains. One feels that he has got into a place different from the usual resorts. Distant views are not to be had, of course, except from the mountain tops, but it does not seem shut in; it is too large, the summits are too far apart, for that. There is plenty of sunlight, of air, of woods, of streams and mountains; and the world with its cares and troubles is shut out. Then again it is not fashionable. The class of people who take their summer outing by shifting from a city to a country drawing-room do not go to Waterville. Rest, recreation, and Nature are its chief attractions. As to its natural attractions, just run your eye over the map, noticing the dotted lines with the multitude of names attached. Those lines represent paths. There are over thirty miles of them in the valley,—all well wooded, all well kept, and all secure from intrusion. For a group of young ladies to start in the morning for an all-day tramp on those paths without a male protector excites not the least attention or remark. It is perfectly safe, and a splendid liberty.

Then those who like severer work can find it in abundance by abandoning the paths and taking to the woods in almost any direction. There is plenty of splendid climbing on the slopes of Tecumseh, Black, Osceola, or the Tripyramids, from whose northern and southern flanks came the great slides of 1869 and 1885. The most troublesome cliff I have ever scaled can be reached from Mad River Notch.

As to the fishing, count the brooks. More I do not care to say, for there are several of us who are somewhat selfish in our piscatorial pleasures.

Finally, the valley is so placed that it is admirably adapted for use as a starting-point for long trips into all that little-visited region which lies between the Saco on the east and the Profile Notch on the west, and reaches from the Waterville and Albany valleys on the south to the Twin Mountains on the north, — the heart of the mountain region. The details of the topography of this region are almost wholly unknown and are absurdly wrong, at least in many particulars, as figured on our best maps. If the present sketch-map will add a little towards final accuracy, the maker is content; and if this description of the place brings other good Appalachians to the valley, so much the better for those already there.

Middlesex Fells.

BY ROSEWELL B. LAWRENCE.

THE map of Middlesex Fells, published in APPALACHIA, Vol. IV. No. 3, has been out of print for four years. A constant demand for it, numerous changes in wood-roads and paths, and the acquisition of large tracts of land for public purposes, have led to the preparation of a new map. An attempt was made to utilize the work of the U. S. Geological Survey; but the scale adopted by the Government, 1:62,500, was so small that it was found impracticable to use the material in the new map with a scale of 1:15,000. The present map therefore, like the one published in 1886, is the result of compilation and personal exploration. No regular survey has been made, and scientific accuracy is not claimed. That portion of the Fells east of Highland Avenue, Spot Pond, and Main Street in Stoneham, has been carefully worked up by Mr. I. Y. Chubbuck, and is undoubtedly more correct than the remainder.

For the information of those unacquainted with Middlesex Fells, it may be well to repeat that the name has been applied to a picturesque region situated about six miles

N. N. W. of Boston, and having Spot Pond near its centre. It is within the limits of the city of Malden, and the towns of Medford, Winchester, Stoneham, and Melrose. Middlesex is the name of the county, and Fells is an old Saxon word, meaning a tract of wild, stony hills. Several years ago a movement was started by the late Elizur Wright, of Medford, to secure this region as a public reservation. Considerable interest was aroused, but nothing actually accomplished. Meanwhile time has brought certain changes, especially in the direction suggested in the article on Middlesex Fells in APPALACHIA, Vol. IV. p. 214, — the protection and increase of water supplies.

Within the past year the town of Winchester has completed the large dam at the southern end of Turkey Swamp, and the new reservoir is fast filling with water. A small dam has also been built to make a separate basin of the upper portion of the swamp; but as the water of the latter will go into the former, they are called by one name, South Reservoir. North Reservoir applies to the old one constructed in 1873. The water area of the North Reservoir is sixty-three acres, and of the South, 160. The town of Winchester also owns 192 acres bordering upon these artificial ponds, as shown upon the map. The Water Commissioners would be glad to control the entire water-shed, and more or less of it might be donated by the owners to any board authorized to carry out a comprehensive plan of public reservations. Forty-six acres have been offered.

The water of Spot Pond is owned by Malden, Medford, and Melrose; and these municipalities during the past year have taken considerable land around the pond for the protection of their water supply. On the south and east the strip taken is small; on the north larger tracts have been taken, including the meadow around Doleful Pond; and on the west all the land between the pond and Main Street, together with an extensive swamp west of the street. The water area of the pond is 296 acres, and the land taken around it amounts to 415 acres. This land is also shown upon the map.

The town of Medford, for the purpose of securing an additional water supply, has taken Wright's Pond, situated a short distance south of Spot Pond, together with all the land between Forest, Elm, and Fulton Streets, and a small lot on the west side of Forest Street, — a total of 220 acres. The above holding is shown on the map. The Medford Water Commissioners intend to take about thirty acres more on the west of Forest Street, land which drains into Wright's Pond; and it is possible that a new dam may be built north of Pine Hill, necessitating the purchase of about ninety acres additional.

A tract of twenty acres, east of Spot Pond and north of the Ravine Road, has just been donated to the Trustees of Public Reservations of Massachusetts, on condition that it be called the Virginia Wood. It is well diversified, and covered with oak, pine, and hemlock. The Trustees were unable to accept this gift until a fund was provided, the income of which will be used for the care of the property. Towards such a fund of $2,000, members of the Appalachian Mountain Club have subscribed $326, and citizens of Medford, Melrose, Malden, and other places have also contributed.

The Park Commissioners of Stoneham, moreover, have purchased as a park reservation the whole of Bear Hill and the larger part of Taylor Mountain. To this they expect to add the land between Taylor Mountain and Main Street, making a total of 92 acres. They have also undertaken to take 19.40 acres on the west shore of Spot Pond, claimed by the joint waterboards; and a lawsuit may be necessary to decide who actually has the land.

Mr. Walter C. Wright of Medford has generously offered to give thirty acres on the west side of Pine Hill, and Miss Ellen M. Wright twelve acres on the east side, provided some responsible board is established to hold for public park purposes and to present an object lesson in forestry.

When we summarize these holdings in Middlesex Fells, we have 519 acres of water, and 939 acres of land already reserved in one way or another for the benefit of the public; we also find 30 which are likely to be taken in the near future, and 88 acres offered by their owners; a total of 1,696 acres, land and water.

It is very interesting to compare the relative situation of these various tracts. An irregular area with the Winchester

Reservoirs on the west, Spot Pond and the new Medford Reservoir (Wright's Pond) on the east, Bear Hill on the north, and Pine Hill on the south, would include only about 400 which are not counted above as already public or likely to become so. This condition of things is certainly a great encouragement towards some comprehensive action; and public opinion in the towns concerned is steadily growing in favor of a Middlesex Fells Reservation, irrespective of town bounds. To the area described above should be added the hills which overlook Winchester; and the Water Commissioners, and probably the citizens of that town, would be glad to assist in such a movement.

When we turn to the eastern portion of the Fells, the prospect is not so encouraging. A railroad has been surveyed, to branch from the Western Division of the Boston and Maine, at Fells Station, and, passing the northeast corner of Spot Pond, connect with the present Stoneham Branch of the Southern Division of the same railroad. In consequence of this plan, rocks and swamps have become gold-mines, and corner lots abound. The Virginia Wood, however, is secure.

It certainly will be a great pity if the section containing the Cascade, Black Rock, Bear's Den, Hemlock Pond, and Stone Monument cannot be reserved for the public,—a section having so many natural beauties, and deserving so markedly the characteristic name of Fells. Chicago and other western cities would give a million for six hundred such acres. These fells and dells are at Malden's back door, and yet she does not appreciate her opportunity; and Boston, with her countless scenic beauties of hills, rivers, and shore, does not yet realize that many of Nature's gems will be sacrificed unless action is taken soon.

Thanks to the Trustees of Public Reservations, something may be accomplished before it is too late. By invitation of this board a meeting was held, December 16, in the rooms of the Boston Park Commission, to which were invited the Park Commissioners of Boston and all cities and towns within a radius of eleven miles from the State House. The meeting was large, much interest was manifested, and remarks were made by several gentlemen in favor of comprehensive action in the direction of a Metropolitan Park Commission. It was voted unanimously that the Chairman and Secretary, with five others whom they may join with them, be a committee to prepare a memorial to the Legislature calling attention to the needs of the Boston district as respects the provision of public open spaces. This committee is now preparing for work.

Report of the Recording Secretary for 1891.

On Jan. 1, 1892, the corporate membership of the Club was 756. The losses amounting to 81, and the accessions 106, the net gain for the year was 25. The Honorary Members numbered 13; Victor Adolphe Malte-Brun having deceased, and J. B. Harrison having been added to the list. The Corresponding Members numbered 46; J. E. Hilgard having deceased, and Raphael Pumpelly, Edouard Alfred Martel, and Vittorio Sella having been added. The total membership, Jan. 1, 1892, was 815, an increase of 27. The Life Members numbered 53. The Hon. Robert C. Pitman, President for the year 1889, died March 5.

There were held during the year nine regular meetings, one special, and one field meeting, the average attendance being 125. There were presented at these meetings seven reports and nineteen papers. The White Mountains had three communications; Maine, New York, and Japan, two each; and North Carolina, Colorado, the Selkirks, Scotland, and Switzerland, one each. There were four papers of a general character, and six were illustrated with the lantern.

A successful field-meeting was held at the Laurel House, Catskill Mountains, July 1–10, and there was a Club camping-party at Moosehead Lake in August. For other excursions and outings, reference is made to the report of the Excursion Committee.

The Snow-Shoe Section had several meets early in the year, and snow-shoe trips were taken during the excursion to Waterville, N. H., in February.

The section for field study continued its work. At the annual meeting, February 28, Professor W. H. Niles gave a talk on "Waves," illustrated with the stereopticon. There were four field studies: Dedham, June 13, "Water Power," by Mr. J. E. Alden; Ipswich, September 19, "Sand Dunes," by Dr. Thomas Crozier; Newtonville, November 7, "Sand Plain," showing condition existing at the close of the glacial period, by Professor W. M. Davis; and Salem, November 21, "Historical Old Salem," by Mr. G. M. Jones.

The annual social meeting was held at the Hotel Vendome, February 5, the attendance being 170.

No. 3 of APPALACHIA, Vol. VI., was published in July. A topographical map of Monadnock Mountain was issued with APPALACHIA, and the map of the country about Worcester is now ready for distribution.

The unusual events of the year were two exhibitions held under the Club's auspices. The exhibition of the Brooklyn Institute Collection of Geographical Appliances was held in the Winslow Skating Rink, May 11–30. A Botanic Exhibition was held at the Club-room, December 9–19. These exhibitions were largely attended, and were considered very successful.

It is also to the credit of the Club that substantial assistance has been given toward the preservation of the "Virginia Wood" in Middlesex Fells. To the fund of $2,000, requested by the Trustees of Public Reservations for the care of the property, Club members subscribed $326.

Respectfully submitted,

ROSEWELL B. LAWRENCE,
Recording Secretary.

Report of the Corresponding Secretary for 1891.

ANY account of the details of the work of this office must involve some repetition of the form and content of previous reports. The correspondence has reference mainly to the supply of new material for the library, the securing of exchange relations with other societies, the recovery of periodicals which have failed to arrive according to expectation, inquiries about the aims and constitution of the Club and conditions of membership. A few letters pass between the Secretary and Corresponding Members on alpine topics of general interest or on club management. As all matters in which the Secretary needs advice or additional authority are referred to the Council, they are not brought in detail to the notice of the Club.

Our relations with corresponding societies are cordial, and are marked by a friendly readiness to supply such periodical literature as has missed its destination. One of our exchanges, the Scottish Geographical Society, has withdrawn, owing to its need of curtailing expenses. We have added, however, the Crimean Alpine Club, a new organization; the Belluno section of the Italian Alpine Club; and the Geographical Society of Paris.

The Corresponding Secretary was appointed by the Council delegate to such alpine and geographical meetings as he might find it convenient to attend during his summer tour in Europe; but he was prevented by unforeseen circumstances from attending any meetings, though enjoying the privilege of meeting individual members of various societies.

The miscellaneous books of the library have been used about as much as usual; but the periodicals do not receive the attention which their abundance, their literary excellence, and their intrinsic interest merit. While the Register contains a list of all these publications, their scope is not definitely appreciated until one sees the magazines themselves. Some societies publish at regular intervals brief statements of the principal contents of their exchange periodicals. The adoption of some such plan by us, as the monthly or bi-monthly issue of a leaflet showing the recent accessions to the library, and the titles of the principal articles published in exchanges, would make this part of the library more valuable to Club members. To prepare this, however, would require more time than could be given by the present librarian; but with suitable assistance, which could probably be readily obtained, the matter could be easily arranged if the advantages should seem to the Club to warrant the needful expenditure. The library has again outgrown its shelf capacity, and an additional bookcase is needed at once.

The accessions to the library, which are noted in the detailed appendix to this report, are derived, as usual, mostly from exchanges. From this source we have received 360 volumes or parts. By the binding of material on hand, 33 volumes were added; 46 books were purchased, and 21 given to the Club. Of the 41 maps added, all but two came from the United States Geological Survey. The library now contains about 630 bound volumes, 1,230 pamphlets, and 875 maps.

Respectfully submitted,

F. W. FREEBORN,
Corresponding Secretary.

ACCESSIONS TO THE LIBRARY FOR THE YEAR 1891.

FROM CORRESPONDING SOCIETIES.

American.

American Geographical Society. — Bulletin, Vol. XXII. 4 and Suppl.; XXIII. 1–3.

American Museum of Natural History. — Annual Report for 1890-91; Bulletin, Vol. III. 2.

California Academy of Sciences. — Proceedings, Vol. III. 1.

Cambridge Entomological Society. — Psyche, Vol. VI. 178–189.

Essex Institute. — Bulletin, Vol. XXII. 4-12; XXIII. 1-6.

Geological and Natural History Survey of Canada. — Annual Report, IV.

Geological and Natural History Survey of Minnesota. — Annual Report, XVIII.; Bulletin, 6.

Geological Survey of Missouri. — Bulletin, 1-5; Biennial Report of State Geologist to 36th General Assembly.

Lick Observatory. — Reports on Total Eclipse of the Sun.

National Geographic Society. — Vol. II. 5; III. pp. 1–204.

New York State Survey. — Report of Progress, 1890. Report of Forest Commission for 1890.

Philadelphia Academy of Natural Sciences. — Proceedings, 1890, Part 3; 1891, Parts 1, 2.

Smithsonian Institution. — Annual Report for 1888.

Torrey Botanical Club. — Bulletin, XVIII. 1-12.

United States Geological Survey. — Annual Report, X. Parts 1, 2; Bulletin, 62, 65, 67–81; 39 atlas sheets.

United States War Department. — Annual Report of the Chief Signal Officer, 1890.

Foreign.

Associació d' Excursions Catalana. — Buttletí, Any XIII. 145–147; Biblioteca Popular, VI.

Club Alpin Belge. — Bulletin, 1891, 14.

Club Alpin Français. — (*Direction Centrale*) Annuaire, XVII.; Bulletin, 1890, 9; 1891, 1–8. (*Section des Alpes Maritimes*) Bulletin, II., III. 1, 2; IV., X., XI. (*Section du Sud-Ouest*) Bulletin, 28, 29.

Club Alpino Italiano. — (*Direzione Centrale*) Bollettino, XXIV. 57; Rivista Mensile, IX. 12; X. 1–11.

Club Alpin Suisse. — (*Comité Central*) Jahrbuch, XXVI. Beilagen zum Jahrbuch, XXVI.; (*Section Genevoise*) L'Écho des Alpes, 1891, 1–3.

Deutscher und Österreichischer Alpenverein. — Mittheilungen, 1891, 1–22; Zeitschrift, XXI., XXII.

Magyarországi Karpát-egyesület. — Jahrbuch, XVIII.

Norske Turistforening. — Årbog, 1890.

Österreichischer Alpen-Club. — Österreichische Alpen-Zeitung, XII. 311, 312; XIII. 313–338.

Österreichischer Touristen-Club. — Österreichische Touristen-Zeitung, XI. 4, 6–17, 19–23.

Siebenbürgischer Karpathenverein. — Jahrbuch, XI.

Società Alpina Friulana. — In Alto, II. 1–6.

Società degli alpinisti Tridentini. — Annuario, XV.

Société des Touristes du Dauphiné. — Annuaire, 14–16.

Svenska Turistförening. — Årsskrift, 1891.

Geographische Gesellschaft (*Greifswald*). — Jahresbericht, IV.

Gesellschaft für Erdkunde (Berlin). — Verhandlungen, XVII. 8–10; XVIII. 1–6.

Imperatorskoye Russkoye Geographitcheskoye Obshtchestvo. — Izviestiya, XXVI. 5; XXVII. 1–4; Otchot, 1890.

Kais.-Königl. Geographische Gesellschaft. — Mittheilungen, N. F. XXIII.

Kais.-Königl. naturhistorisches Hofmuseum (Vienna). — Annalen, Bd. V. 4; VI. 1, 2.

Nederlandsch Aardrijkskundig Genootschap. — Tijdschrift, Ser. II. Deel. VII. 5; VIII. 1–7; Meded. Deel. III. 1, 2; Meer uitgebreide Artikelen Deel. IV. 1.

Royal Geographical Society. — Proceedings, Vol. XIII. 1–12.

Sociedad Geografica (Madrid). — Boletin, Tomo XXX. 1–6; XXXI. 1–3.

Sociedade de Geographia (Lisbon). — Boletim, 9ª Ser. 7–12; Les Champs d'Or.

Societá Geografica Italiana. — Bollettino, IV. 1–10.

Société de Géographie (*Paris*). — Bulletin, 7ᵉ Sér. Tome XI. Nº 4; Notice, 1891.

Société de Géographie Commerciale (Bordeaux). — Bulletin, 1890, 20–24; 1891, 1–21.

Société de Géographie Commerciale (Paris). — Bulletin, Tome XII. 6; XIII. 1–3; Notice sur la Société.

Société de Géographie de Tours. — Revue, 1891, 1, 2.

Société Royale de Géographie d'Anvers. — Bulletin, Tome XV. 2–4; XVI.

Société Khédiviale de Géographie. — Bulletin, Sér. III. Num. 5, 6.

Teikoku Daigaku (Imperial University, Tokio). — Journal of the College of Science, Vol. IV. 1.

Verein für Erdkunde (Leipsic). — Mittheilungen, 1890; Wissenschaftliche Veröffentlichungen, I.

Verein für Erdkunde an der Universität Wien. — Bericht über das XVI. Vereinsjahr.

OTHER EXCHANGES.

Goldthwaite's Geographical Magazine. — Vol. I. 1–7; II. 8–12.

Revue Géographique Internationale, Vol. XV. 180–191.

White Mountain Echo. — XIII. 1–12.

DONATIONS.[1]

Bulletin of New England Meteorological Society, Nos. 74–85.

The Mountains of Oregon. W. G. Steel. Gift of Author.

Ascent of the Volcanoes Nantai-san, Asama-yama, and Nasu-take. *W. J. Holland.*

Geological Structure of Selkirk Range. *G. M. Dawson.* Gift of Author.

Journal of a Voyage to Peru, etc. Chas. Brand. Gift of *T. T. Woodruff.*

The White Mountains. *J. H. Ward.* Gift of Author.

Nel Caucaso Centrale, etc. *Vittorio Sella.* Gift of Author.

Kame Ridges, Kettle-holes, etc., in Hingham, Mass. T. T. Bouvé.

APPALACHIA. — Vol. VI. 3.

Register of the Appalachian Mountain Club, 1891.

Abstract of the Proceedings of the Society of Arts, Mass. Institute of Technology, 1890–91. Gift from the Institute.

Mount Washington in Winter. E. L. Wilson. Gift of *A. Moore.*

Trenton Falls. N. P. Willis, Editor. Gift of *T. T. Woodruff.*

Flora Azorica. Mauritius Seubert. Gift of Miss Dabney,

Notes on the Cryptogamic Flora of the White Mountains. W. G. Farlow.

The Labrador Coast. *A. S. Packard.* Gift of Author.

Map of Monadnock Mountain, N. H.

Kura Kewar — Ukerewe Njansa. K. Ganzenmüller. Gift of Author.

How to Enliven Geographical Instruction, etc. K. Ganzenmüller. Gift of Author.

United States Department of Agriculture, — Agricultural Statistics; Agricultural Graphics; Forestry Division, Bulletin 5.

PURCHASED.

The Virginia Tourist. Edw. A. Pollard.

Etna. G. F Rodwell.

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[1] Names of Club members are in italics.

Taghconic. Godfrey Greylock.
Typical Elms and other Trees of Massachusetts. L. L. Dame.
Magazine of the Royal Scottish Geographical Society, Vol. VII. 1–12.
Camping and Camp-Outfits. G. O. Shields.
Outing, Vol. XVII. 5; XVIII. 1–6; XIX. 1, 3, 4.
Scenery of the White Mountains. Wm. Oakes.
Bollettino, Club Alpino Italiano, 4, 5, 20, 26.
The Alpine Journal, XV. 111–114.
Monte Rosa e Gressoney. V. Sella and D. Vallino.
Im Hochgebirge. Emil Zsigmondy.
Lessons and Manual of Botany. Asa Gray.
Flora of the Southern United States. A. W. Chapman.
Our Native Ferns and their Allies. L. M. Underwood.
Manual of the Botany of the Rocky Mountains. J. M. Coulter.
The Orchids of New England. Henry Baldwin.
Mosses of North America. Leo Lesquereux and T. P. James.
Synopsis of the North American Lichens. Edward Tuckerman.

Treasurer's Report for 1891.

RECEIPTS.

Cash on hand, Jan. 1, 1891			$1,322.49
Life-Membership: Mrs. A. G. Cochrane, James Shepherd, C. Fred Howe, Rev. P. S. Moxom, — 4 at $30			120.00
Admission fees:			
From 100 new members at $5		$500.00	
Assessments from 4 members for 1890.			
“ “ 581 “ “ 1891.			
“ “ 3 “ “ 1892.			
Total . . 588 at $3		1,764.00	
Interest:			
On Permanent Fund to Jan. 1, 1891	$85.64		
On Reserve Fund to Jan. 1, 1892	50.53		
On Treasurer's Bank accounts	46.37		
		182.54	
Donations:			
From Mrs. J. H. Thorndike for general purposes	$10.00		
From a member for general purposes	10.00		
		20.00	
Field Meetings and Excursions		146.27	
Amounts carried forward		$2,612.81	$1,442.49

Amounts brought forward		$2,612.81	$1,442.49
Sales of Appalachia and other Publications:			
500 Maps, White Mountains	$37.50		
Maps of "Country about Boston" etc.	253.10		
Advertisement in Vol. VI. No. 2	25.00		
Appalachia	38.68		
		354.28	
Total Income			2,967.09
			$4,409.58

Payments.

To Trustees of the Permanent Fund,			
For 4 Life-Memberships	$120.00		
For interest on the Fund to Jan. 1, 1891, appropriated by the Club Jan. 14, '91	85.64		
Appropriation by the Club, Jan. 14, 1891	100.00		
		$305.64	
To Trustees of the Reserve Fund,			
For Interest on the Fund to Jan. 1, 1892, appropriated by the Council in December, 1891	$50.53		
Appropriation by the Council in Dec., '91, being the amount of the Treasurer's deposit in Boston Five Cents Savings Bank	555.18		
		605.71	
			$911.35
Postage and stationery		$176.82	
Printing and advertising	$97.61		
Club Register for 1891	114.84		
		212.45	
Clerical services		191.50	
Expenses of meetings		102.00	
Annual Reception		19.60	
Library:			
For Books	$66.30		
For Binding	50.80		
		117.10	
Room, at No. 9 Park Street:			
For Rent	$400.00		
For Care, Cabinet, etc.	71.69		
		471.69	
Appalachia, and other Publications:			
For Vol. VI. No. 3	$300.69		
For Delivery of the same	43.48		
Amounts carried forward	$344.17	$1,285.16	$911.35

Amounts brought forward	$344.17	$1,285.16	$911.35
Maps, Mount Monadnock	103.80		
" White Mountains	28.00		
" Country about Worcester	160.50		
Mounting the same	41.15		
Mounting maps, Country about Boston	155.55		
		833.17	
Donations:			
For Geographical Exhibition, contribution per account below	$95.30		
Contribution to Trustees of Public Reservations	10.00		
		105.30	
Department of Improvements:			
For paths		123.00	
Department of Topography:			
For work on Map of Mountain Locations in New England		50.00	
Department of Natural History:			
For a Maximum Thermometer	$3.50		
Expenses of Botanic Exhibition	41.86		
		45.36	
Total expenses			2,447.99
Total payments			$3,359.34
Cash on hand at close of the year:			
In Union Safe Deposit Vaults		$903.97	
Check on Howard National Bank		146.27	
			1,050.24
			$4,409.58

Respectfully submitted,

JOHN E. ALDEN,
Treasurer.

BOSTON, Jan. 6, 1892.

The undersigned have examined the accounts of the Treasurer of the Appalachian Mountain Club, for the year 1891, and find them correct, with satisfactory vouchers for all payments. We have verified the cash amounting to $1,050.24.

CHARLES H. FRENCH, } *Auditors.*
C. H. HARDWICK, }

ACCOUNT OF THE GEOGRAPHICAL EXHIBITION.

Presented by William M. Davis, Chairman of the Committee.

PAYMENTS.

Brooklyn Institute for transportation and supervision	$301.50	
Rent of Hall, and Janitor	481.00	
Frames for Maps	45.00	
Printing	25.00	
Clerical services	5.75	
Photographs	8.00	
Sundry expenses	13.05	

RECEIPTS.

Contributions collected by the Committee		$784.00
Contribution by Appalachian Mountain Club		95.30
	$879.30	$879.30

STATEMENT OF RECEIPTS FOR FIRST SIXTEEN YEARS.

Year.	Memberships.					Life Membership.	Sales of Appalachia and other publications.	Interest.	Annual Reception.	Field Meetings and Excursions.	Donations.	Total.
	Admission Fees.	Yearly Assessments.	Back Assessments.	Advance Assessments.	Total.							
1876	252.00	....	....	....	252.00	....	43.13	....	....	....	....	295.13
1877	50.00	254.00	8.00	....	312.00	....	98.00	....	....	....	....	410.00
1878	54.00	264.00	....	....	318.00	60.00	75.70	....	....	....	43.00	496.70
1879	148.00	256.00	40.00	4.00	448.00	....	130.85	1.90	....	....	221.70	802.45
1880	178.00	332.00	24.00	4.00	538.00	90.00	116.90	10.79	....	....	86.21	841.90
1881	222.00	384.00	18.00	12.00	636.00	120.00	141.40	17.59	....	....	62.55	977.54
1882	256.00	528.00	74.00	....	858.00	90.00	309.43	22.07	....	....	2.00	1281.50
1883	395.00	1000.00	20.00	27.00	1442.00	210.00	197.58	39.72	9.72	82.88	22.00	2003.90
1884	285.00	1059.00	21.00	9.00	1374.00	60.00	93.51	53.29	26.80	11.47	1.00	1620.07
1885	375.00	1212.00	69.00	12.00	1668.00	60.00	113.19	61.09	.45	70.73	534.50	2507.96
1886	426.00	1317.00	90.00	24.00	1857.00	330.00	247.94	88.62	12.50	124.35	364.20	3024.61
1887	385.00	1491.00	90.00	42.00	2008.00	180.00	183.80	79.34	10.00	40.20	114.00	2615.34
1888	355.00	1536.00	117.00	12.00	2020.00	180.00	67.06	42.52	9.20	45.94	754.76	3119.48
1889	655.00	1617.00	69.00	27.00	2368.00	120.00	93.85	151.29	11.48	....	127.60[1]	2872.22
1890	450.00	1620.00	24.00	15.00	2109.00	150.00	1168.13	217.12	3.73	....	220.85	3868.83
1891	500.00	1748.00	12.00	9.00	2264.00	120.00	354.28	182.54	....	146.27	20.00	3087.09
Total	4986.00	14613.00	676.00	197.00	20472.00	1770.00	3434.75	967.88	83.88	521.84	2574.87	29824.72

[1] Including $8.00 for keys.

STATEMENT OF EXPENDITURES FOR FIRST SIXTEEN YEARS.

YEAR.	Permanent Fund.	Reserve Fund.	Stationery, Postage, and Printing.	APPALACHIA and other Publications.	Department of Topography.	Improvements and Explorations.	Natural History and Art.	Clerical Expenses.	Expenses of Meetings.	Library.	Club Room.	Donations.	Total.
1876	....	....	109 91	140.86	....	15.00	....	....	....	....	....	....	265.77
1877	....	....	60.65	364.13	....	....	13.45	....	....	....	....	....	438 23
1878	....	....	202.31	169.80	2.00	20.00	52.48	....	....	....	....	....	446 59
1879	60.00	....	162 31	347.92	19.20	158.76	....	....	....	....	....	....	748.19
1880	90.00	....	186.17	318.13	19.00	72.60	....	....	....	....	....	....	685.90
1881	120.00	....	394 09	246.23	87.95	68.00	....	19.75	22.70	....	....	....	906.72
1882	90.00	....	258.99	675.93	25.40	....	....	34.50	25.00	....	....	....	1109.82
1883	281.72	....	389 73	866.27	23.65	160.87	....	67 41	1.88	69.78	....	....	1360.31
1884	113.42	....	882.49	1176.53	....	21.00	....	57.62	....	58 10	....	....	1809.16
1885	86.48	....	363 27	361.21	229.00	102.00	....	106.00	53.06	72.50	284.17	25.00	1682.79
1886	270.00	....	432.38	932.91	77.73	46.00	74.00	121.45	171.15	131.72	667.80	49.88	2974 52
1887	388.38	1000.00	289.38	866.71	538.97	123 02	20.12	107.12	145 45	102.50	504.81	....	3786.46
1888	280 00	100.00	473 95	597.59	....	779.55	8.32	49.50	93.45	120.56	456.12	....	2959.04
1889	220.00	114.70	330.77	1127.91	7.20	118 58	86.76	123.75	68.86	67.33	487.34	....	2813 29
1890	283.48	48 59	463 43	1082 95	....	46.07	101 56	181.00	58 35	96.06	464.95	....	3426 44
1891	305 64	605 71	889 27	833 17	50 00	123.00	45.36	191.50	121.60	117.10	471.69	105.30	3359.34
Total	2589 12	1869.00	4949.10	9908.85	1080.10	186 896	402.05	1059.60	761.00	835.65	3336.38	180.18	28774.48

Report of the Trustees of the Permanent and Reserve Funds for 1891.

PERMANENT FUND. — PRINCIPAL.

1892.			
January 12.	Amount on deposit in Suffolk Savings Bank	$1,319.38	
	Amount on deposit in Provident Institution for Savings	1,019.36	
	Amount on deposit in Lexington Savings Bank	30.38	
	Total on hand Jan. 13, 1891, as per last account		$2,369.12
1891.			
January 31.	Appropriation to Permanent Fund by vote of the Club	$100.00	
March 11.	Received from J. E. Alden, Treasurer, for Life-Membership of Mrs. A. G. Cochrane	30.00	
May 6.	Received from J. E. Alden, Treasurer, for Life-Membership of Mr. Samuel C. Lawrence	30.00	
May 21.	Received from J. E. Alden, Treasurer, for Life-Membership of Mr. C. Fred Howe	30.00	
	Amounts carried forward	$190.00	$2,369.12

	Amounts brought forward	$190.00	$2,369.12
December 12.	Received from J. E. Alden, Treasurer, for Life-Membership of Rev. P. S. Moxom	30.00	
			220.00
	Total Principal on hand Jan. 12, 1892		$2,589.12

PERMANENT FUND.—INTEREST.

1891.			
January 22.	Interest on Deposit in Provident Institution for Savings for six months to January, 1891	$20.38	
	Interest on same for six months to July, 1891	20.78	
April.	Interest on Deposit in Suffolk Savings Bank for six months to April, 1891	26.38	
	Interest on same for six months to October, 1891	26.90	
April.	Interest on deposit in Lexington Savings Bank for three months to April, 1891	.37	
	Interest on same for six months to October, 1891	.75	
	Total amount of Interest on hand Jan. 12, 1892, and subject to action of the Club		$95.56
	Total Permanent Fund, Principal and Interest		$2,684.68

RESERVE FUND.

1891.			
January 13.	Amount on hand as per last account	$1,263.29	
	Interest on same in Massachusetts Loan and Trust Co., for one year at 4%	50.53	
1891.			
December 31.	Amount received from J. E. Alden, Treasurer, appropriated to Reserve Fund by vote of the Council, Dec. 30, 1891, and on deposit in Five Cents Savings Bank	555.18	
	Total Reserve Fund on hand Jan. 12, 1892		$1,869.00

REST F. CURTIS,
WM. H. NILES,
ISAAC Y. CHUBBUCK, } *Trustees.*

BOSTON, Jan. 13, 1892.

Reports of the Councillors for the Autumn of 1891.

Natural History.

By Julia C. Clarke.

The valuable series of daily observations of rainfall and temperature, with instruments furnished by the Club, has been carried on at the same six stations in the White Mountain region as for the previous five years, and regular reports have been received by the Club through the New England Meteorological Society. This work is so satisfactory that additional observers are much desired.

In December, 1891, from the 9th to the 19th inclusive, a Botanic Exhibition was held under the auspices of the Department. This was open to the public, and was well attended throughout. The walls of the Club Room and of two rooms adjacent were lined with mounted specimens of flowers, ferns, mosses, lichens, and marine algæ, and hundreds of other specimens were displayed on tables. The collection was obtained mostly by loan from our own members, but some outside friends were very generous in lending specimens which could not otherwise have been had.

The display of ferns was excellent, embracing many foreign species, and the flora of the Pacific Coast was especially well represented, one large collection covering a period of eight months' blossoming. Several sets of Swiss flowers were shown, and two of these were obtained during the range of a whole season.

Some hundreds of the specimens furnished for the exhibition have been given outright to the Club, as the nucleus of an herbarium; and it is now hoped that members will have the increase of this herbarium in mind, particularly when they have opportunity to collect plants in mountain regions.

The growth of interest in botanic study which has been manifested in the Club within the last two or three years may be traced directly to the influence of the country "outings" taken nearly every week in the year.

Some valuable botanic manuals have lately been added to the library, which it is hoped may facilitate work of an advanced kind by members of the Club.

Reports of the Councillors for the Autumn of 1891.

Topography.

By Charles Eliot.

The map of Monadnock Mountain, which was mentioned in the last report, has been successfully traced and clearly printed on a reduced scale; namely, 1 : 20,000. It was placed on sale last spring, and distributed to Club members with the July number of Appalachia.

As published, the map shows the topography of about twenty-two square miles of rough New England country. The surveyed area is bounded in most directions by the public roads which encircle the mass of the mountain. The circuit by these roads measures about eighteen miles. The roads climb over many spurs of the mountain, and descend to cross many brooks which issue from it. They are hilly, and vary in elevation above sea-level between 1,100 and 1,500 feet. Within their circuit the surface of the earth mounts upward rapidly, and attains an additional 1,500 feet of elevation, raising the summit of Monadnock to 3,186 feet above the sea. In several parts of the mountain 500 feet of elevation is attained in an eighth of a mile, or 660 feet of horizontal distance. The map shows every considerable ridge and hollow, every cliff and escarpment, every torrent and brook, with a faithfulness which has seldom if ever been equalled in American map-making. As a specimen of the manner in which modern science is capable of depicting upon paper in plain black and white lines the multitudinous forms of the surface of the earth, the sheet is well worthy of publication by the Club.

The Map of the Country about Worcester, which was asked for by many citizens of that city after the publication of the Boston map last year, engaged the attention of the Councillor during the summer, and has just been published. Like the

Boston map, it is the result of combining two whole sheets with parts of four other sheets of the new topographical survey of Massachusetts. The new map is simply a continuation westward of the Boston map, and it is of the same size and form. The valley of the Nashua River descends northward through the middle of the sheet, and that of the Blackstone southward. Mt. Wachusett appears in the northwest corner.

Although the Government sheets, and consequently these reprints, are lacking in many so-called "practical details," such as the location of post-offices and railroad stations, they are nevertheless very valuable, because they show by their sketched contour-lines the general conformation of the surface of the land in a manner never realized in any previously published maps.

During the coming year this department hopes to publish, first, a new map of the Middlesex Fells, material for which is being gathered by Messrs. Lawrence and Chubbuck; and second, a map of New England on a scale of twenty miles to an inch, showing, with such accuracy as may be practicable, the geographical positions of such of the principal hills and mountains of the region as have been authoritatively located by Government or other competent surveyors. Such a map will prove interesting to all who look off over New England from any of her summits.

Lastly, your Councillor may be permitted to report the outcome of the movement "for facilitating the preservation of beautiful and historical places in Massachusetts," referred to in his last report. The Board of Trustees, which was proposed by the committee of the Council of the Appalachian Mountain Club, was finally incorporated by a special Act of the Legislature, which was approved by the Governor May 21, 1891. The Board was organized by the choice of Hon. George F. Hoar of Worcester as President, and Hon. William S. Shurtleff of Springfield as Vice-President; and the standing or executive committee of the Board has been actively engaged during the past summer in fostering and encouraging various schemes for the preservation of interesting places, some of which will be ripe for announcement before long. The Act of Incorporation is appended to this report.

CHAPTER 352. ACTS OF THE LEGISLATURE OF MASSACHUSETTS, 1891.

AN ACT TO INCORPORATE THE TRUSTEES OF PUBLIC RESERVATIONS.

Be it enacted, etc., as follows:

SECTION 1. Frederick L. Ames, Philip A. Chase, Christopher Clarke, Charles R. Codman, Elisha S. Converse, George F. Hoar, John J. Russell, Leverett Saltonstall, Charles S. Sargent, Nathaniel S. Shaler, George Sheldon, William S. Shurtleff, George H. Tucker, Francis A. Walker, George Wigglesworth, their associates and successors, are hereby made a corporation by the name of The Trustees of Public Reservations, for the purpose of acquiring, holding, arranging, maintaining, and opening to the public, under suitable regulations, beautiful and historical places and tracts of land within this Commonwealth; with the powers and privileges and subject to the duties set forth in Chapter one hundred and fifteen of the Public Statutes, and in such other general laws as now are or hereafter may be in force relating to such corporations; but said corporation shall have no capital stock.

SECTION 2. Said corporation may acquire and hold by grant, gift, devise, purchase, or otherwise, real estate such as it may deem worthy of preservation for the enjoyment of the public, but not exceeding one million dollars in value, and such other property, both real and personal, as may be necessary or proper to support or promote the objects of the corporation, but not exceeding in the aggregate the further sum of one million dollars.

SECTION 3. All personal property held by said corporation, and all lands which it may cause to be opened and kept open to the public, and all lands which it may acquire and hold with this object in view, shall be exempt from taxation, in the same manner and to the same extent as the property of literary, benevolent, charitable, and scientific institutions incorporated within this Commonwealth is now exempt by law; but no lands so acquired and held and not opened to the public shall be so exempt from taxation for a longer period than two years. Said corporation shall never make any division or dividend of or from its property or income among its members.

SECTION 4. This act shall take effect upon its passage. [*Approved May* 21, 1891.

Reports of the Councillors for the Autumn of 1891.

Exploration.

By John L. Batchelder.

In presenting this report the Councillor regrets that he was unable to undertake any work himself during the past year. Early in the summer a notice was inserted in one of the regular Club circulars, requesting that any accounts of tours in unexplored regions be handed to the Councillor; but up to the November meeting at which reports are due none were forthcoming. In past years many very interesting and instructive trips have been reported, which have redounded to the credit of the Club, and which have proved of great benefit to many of its members, and the Councillor feels sure that he represents the feeling of the Club at large when he urges upon members the advisability of handing in all accounts of tours undertaken in unreported regions. Since the November meeting several accounts of pedestrian tours in new country have been reported, as follows: —

A trip made by Messrs. A. H. Williams, C. E. Fay, and others over Mt. Paugus to Chocorua;

A September trip of Messrs. C. E. Fay and J. R. Edmands, with two porters, over the range from Whiteface to Tripyramid;

An ascent of the Black Snout of the Ossipee Range by Professor Fay. It will be seen from the appended reports that, owing to the energetic tramping of the above-mentioned gentlemen, much new light has been shed on the Sandwich region.

An Excursion from Mt. Whiteface to Greeley's by the Tripyramid Ridge and back *via* Black Mountain. By Charles E. Fay.

On September 2, 1891, Mr. J. R. Edmands and myself, with Onslow Ross and A. T. Davis of Tamworth as porters and axemen, started from the McCrillis farm at Whiteface Intervale for a three days' excursion, which should involve an investigation of the Whiteface-Tripyramid ridge, with a return from the Mad River Valley directly over Black Mountain.

Leaving Mr. McCrillis's after dinner, — the last of our number having returned for a forgotten article did not finally get away until 2.40, — we reached the summit of Whiteface (four miles) at 4.45. The day was perfect, and the view superb. Enjoying the prospect for a quarter of an hour, we got under way again, as yet uncertain where we should pass the night. The slightly higher wooded summit of Whiteface closes the view to the northwest, our intended course; and we were thus kept in ignorance as to the point from which the connecting high ridge to Tripyramid starts from the mass of our mountain. Hence we determined to pass on to that wooded summit, climb a tree, and there decide upon our course from what should appear. That lookout, speedily attained, showed a profound ravine, that of Sabbaday Brook, between ourselves and the ridge in question; that the latter ran in a direction making a slight angle with the first part of the Whiteface-Passaconaway ridge, and that it is joined by a short transverse ridge (down upon which we had but now actually been looking) to the peak of Whiteface we had just left. An alternative was offered us either to retrace our steps, descend to that transverse ridge, follow it as far as possible and build a camp for the night, or to bear northeast toward Passaconaway, — at an angle of some 45° from our goal, — pass the night in a camp which a party of us had constructed some weeks before, perhaps two miles distant on the easterly side of the ridge we now were upon; then in the morning again climb to the crest of this ridge, cross the ravine of the Sabbaday Brook, and attack the opposite ridge from its bed. The lateness of the hour led us to choose the latter alternative. Only an hour of daylight was now left us; and though we made good time, we were given an opportunity to test our powers in finding in the dark a small unobtrusive bush-camp in the midst of a deep forest. Success crowned our efforts at 7.30, and we passed a very comfortable night.

Breaking camp the next morning at 7 o'clock, we soon struck the crest of the ridge above us at one of its minor summits, which, being ledgy and covered merely with low growth, afforded us a clear view of our intended way. Nearly due west, across the deep, densely wooded valley lay the more southerly of the two swells (Q 6.5 and .6) of the Tripyramid ridge.[1] We desired to traverse both of these swells, and, as if to remove any temptation to slight one and make for the summit of the south peak of Tripyramid by an air-line, a second smaller ravine disclosed itself lying between a spur running northeasterly from this second swell (Q 6.6) and the one nearer to that peak (*i. e.* Q 6.5). Obviously then our proper course was to keep as nearly as possible a due westerly direction for the top of the second swell. To follow this course was at first exceedingly difficult, owing to the very rough character of the western slope of the Whiteface-Passaconaway ridge. It is densely wooded, while at the same time moss-grown precipitous masses of rock are broken away from the mountain-side, making wide clefts. The moss was damp and slippery, the hand-holds treacherous, and several bad falls were narrowly escaped. Detours were constantly found necessary; all were made to the left, so that we reached the bottom of the ravine considerably above the point at which we had aimed to strike it. The Sabbaday Brook was already quite a stream, making its way noisily over the light-colored rock fragments in the bottom of a denuded gulch, — irrefutable evidences of a recent slide. Looking up towards Whiteface, we saw a great brownish yellow scar covering many acres of the side of the ridge that we had been descending.

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[1] See Profiles of Tripyramid, APPALACHIA, vol. i. p. 1.

We had reached the brook at 8.45. Taking possibly fifteen minutes to refresh ourselves with its cold waters, we set out again, keeping at first a little up the stream until beyond the foot of the slide, then we bore away directly in the supposed direction of our first summit. The ascent for the first half hour is very steep, but in fairly good timber; then the slope becomes quite gradual, and the walking is excellent, in open forest with no worse undergrowth than the plentiful brakes until, near the top of the ridge, the raspberry vines occupy a region where the forest has been thinned by the gales. By ten o'clock we were upon "Q 6.6." Fairly good views are opened to the westward, for it is upon that side that the trees are fewest. By climbing a convenient one the next swell was seen, and over it the summit of the south Tripyramid comfortably near at hand. In less than an hour we had reached "Q 6.5" through just such easy forest as we had been traversing and with little up-grade, as the depression between the two swells is quite insignificant. Between this and the south peak of Tripyramid, however, there is harder work to be done, as the depression is somewhat deeper, and the upward slope of the peak not only sharp, but more or less obstructed with fallen timber and undergrowth. The summit was attained at exactly noon. Here we paused to lunch and enjoy the prospect. The way out to Greeley's (now Eliott's) Hotel looked fearfully long by way of the ravine of Slide Brook, but it was covered in two hours and a half without special haste. First making our way down the slide of 1885, looking much as the older slide of 1869, just adjacent on the right, looked at the time of my visit in 1874, we descended the many-stranded stream to Beckytown clearing. The principal changes noted were the disappearance of the piles of tree-trunks swept down by the ruin, and the growth of small trees now rapidly reclaiming the old clearing. At three o'clock we emerged from the forest-path above the hotel, and shortly were enjoying its comforts.

But not for long. It was our day for a forced march. Another mountain was still to be ascended, or nearly so. We had planned to encamp on the ridge of Black Mountain, at the spring between Jennings and Noon Peak. So starting afresh after an hour's rest and a good hotel luncheon, we found ourselves at five o'clock at the entrance of the path. The steep ascent to Noon Peak told severely upon our two men, who were hardly used to mountain work, so that on reaching the spring, — which proved to be nearer to Jennings Peak than the map at the hotel had located it, — it was quite too late to build a camp. Water and dead timber were plentiful, and a very comfortable bivouac was prepared.

One uncanny episode of that otherwise agreeable night I will mention, as it may serve to warn others from taking similar risks, Our men had built our fire at the base of a living spruce nearly a foot in diameter. It was a grand blaze, and before composing myself to sleep I inquired of them whether they thought it safe to depend on the tree's not burning off before morning. Too easily reassured by their statement that it would take two such nights to burn it through, I composed myself to sleep. Some time after midnight I was either sleeping lightly or had been awakened, and lay drowsing with closed eyes. The half-lulled sense caught the sound of something like a gentle shower in the spruce boughs. Opening my eyes, I saw the big spruce falling slowly towards us. A sudden ejaculation, "The tree!" proved enough for my sleeping companion, who rolled like a suddenly animated log off into the bushes, instantly followed by his mate. The tree, as if seeing that its revenge was thwarted, stopped at an angle of 45°, held by the limbs of neighboring spruces. It proved to have been partially decayed. As this was the third camp of the season in which a living tree had been used for a back-log with assurances of safety from those in charge of the fire, it may not be unnecessary to utter a word of caution.

Ten minutes were sufficient the next morning to reach the top of Jennings Peak, there to witness a magnificent cloud-effect, which proved a consolation for the almost total loss of prospect on the signal summit. We left this latter at seven o'clock, passed over the second equally high wooded summit a few minutes later, then struck for the Sandwich settlement of Heddle's Mill. Bearing first to the right to avoid a ravine, we kept an almost due easterly course for perhaps two miles through the finest spruce growth that I know of in the whole Sandwich range, or remember ever having traversed. We kept below and north of the subordinate wooded summit that rises sharply on this ridge. If after passing it we had borne to the right, we should more quickly have found our way out to the road. As it was, we came down to the roaring brook which brings down the water of this eastern slope of Black Mountain, and followed it to beyond its junction with the other large stream from Flat Mountain Pond, then striking up the steep left-hand slope in full faith of finding a logging-road. We found an excellent one, and by it reached the open country about noon. Our trip showed Black Mountain to be a feasible ascent for good climbers in a single long summer day even from Tamworth, but a start should be made as early as five o'clock.

AN ASCENT OF BLACK SNOUT. BY CHARLES E. FAY.

Any lover of fine views sojourning in Tamworth or its neighborhood must often be reminded of the superb prospect that would be enjoyed from the summit of the high peak near the northern end of the Ossipee range, locally known as Black Snout, if only it were free of timber. Mr. Sweetser, in his guide-book, says of it that it "is a tempting point for enthusiastic alpestrians, but the summit is so thickly wooded as to render the ascent useless." Nevertheless, finding myself with a party of friends upon Whittier Peak on August 31, I did not withstand its temptation, and decided to abandon good company for a solitary assault upon its neighboring summit.

By Whittier Peak, I mean the mountain so christened by Mr. Sweetser, who was the first, I believe, to apply Whittier's name to a summit in this region, of which the poet was formerly a constant visitor. It is the north-westernmost, conical summit of the Ossipee Range, nearly clear of timber, separated by a distinct *col* from the more densely wooded portion of the range. The name is now applied to about every prominent summit on the northern edge of the range, between the true Whittier and the low mountain overlooking the West Ossipee Station.

From Whittier, Black Snout seems quite near at hand, and I hoped to reach its summit in an hour at the most, the length of time the party proposed to remain and enjoy their fine view. To avoid uncomfortable delays for my companions, it was arranged that they should not detain the carriages for me more than a half-hour after their descent to the Johnson farm. With this inducement to hasten, besides the fact that when alone there is always a tendency to make rapid time upon a wooded mountain, I probably went as fast as I conveniently could, and in cleared places on the run.

Plunging down into the *col* before mentioned, I took a course bearing considerably to the right (west) of my goal, to strike a ridge that led up towards it, and ran into a logging-road with an upward grade, which I followed for a few minutes; but as it seemed to be bearing around too far to the right, it was abandoned for a more direct course through the timber. The way offered more ups and downs than had appeared in the inspection from Whittier Peak, and in some places fallen trees made progress slow, so that it required ten minutes more than the allowed hour to reach its summit. All the latter part of the way I was struck with the fact that the woodchoppers had been there; indeed, large stumps with even surfaces gave evidence that they had selected the best spruces within one or two hundred feet of the highest point.

A glance showed that it would require but slight expense to make it a superb view-point, at least towards the west and north. In the former direction fine views are already afforded between the trees. It is northward, however, that the chief interest would lie. Several visits to Mt. Shaw, the highest point of the range, some six miles farther south, had convinced me that that peak was among the very finest outlooks in the whole mountain region, and especially for the mountains piled in the north. This summit, if cleared, would be hardly less satisfactory — indeed, owing to its greater nearness to them and the pretty rural foreground, possibly an even more satisfactory view-point.

Not taking time to settle this point, especially as clouds were shutting down, I selected my line of return, as nearly as possible a bee-line for the Johnson farm. The first pitch in the east side is sharp, but short; below there is some moosewood undergrowth to impede rapid progress. A little stream was encountered high up. Following its course but a very little way, to my surprise, within ten minutes from the summit, I stumbled into the end of a most excellent logging-road, where loggers had been at work during the past season. Taking this on the run, fifteen minutes brought me to the carriages, and the half-hour of waiting fell to my share instead of my companions'.

Thus it appears that little is required to render an entirely new page necessary to the completeness of Sweetser's White Mountains as regards this section. The Department of Improvements may well undertake the work of making the peak a frequented one. It could not fail to become popular, both for its view and the ease with which it could be attained, and also because the drive up the inviting valley, with its continuous line of farms, along the road turning south at the hamlet of South Tamworth, is of itself one of the most attractive in a region notable for its many delightful drives.

Reports of the Councillors for the Autumn of 1891.

Improvements.

By Warren Upham.

The preceding Councillor of this department, Professor F. D. Allen, at the close of last year transcribed all the memoranda relating to this portion of our work into a most convenient record-book. Separate pages are allotted to each of the twenty-seven mountain paths which have been made under the auspices of the Club since its organization. Six other pages contain accounts of the six mountain camps belonging to the Club, including the Madison Spring Hut. Lastly, twenty pages, each divided into two columns, give dates at which record-bottles have been placed on forty mountain summits; and in many instances, where the enclosed rolls have been filled with notes, the dates of their removal and the supply of new rolls are added.

During this year I have inserted in this book concise memoranda of the work of this department, wherever paths and camps have been repaired and rolls from record-bottles have been received.

Work on paths this year has included repairs of numerous paths on the north side of Mt. Adams, on the Carter range, on Mt. Willey, to the North Twin Mountain, and from Livermore to Waterville, besides the construction of a new path up Mt. Passaconaway. The following brief descriptions of these several pieces of work will inform the Club of all that has been done by the Department of Improvements; for there have been no noteworthy repairs of camps, nor any new undertakings of that kind.

In June Mr. Hubbard Hunt, of Randolph, N. H., worked on repairs of mountain paths to the amount of $70, paid by the Club, besides about $25 worth of work gratuitously given by him to Appalachian paths in his vicinity. The paths on the north side of Mt. Adams repaired for the Club by Mr. Hunt comprise the Mt. Adams path from Lowe's to the top of Mt. Adams; the Cascades path from the Castles path to the Upper Cascade; the branch path through King's Ravine to its Gateway; another from the A. M. C. camp on the Mt. Adams path to the Lower Cascade; the path from the Ravine House up the Durand Ridge; and the King's Ravine branch from the last. The aggregate length of these paths is about fifteen miles. Several new guide-boards having " A. M. C. PATH " painted on them, were used here. The path from the Glen House to the Carter Notch and Dome, and thence along this range to the summit of Mt. Moriah, was cleared of fallen trees and otherwise repaired by Mr. Hunt, and seventeen A. M. C. guide-boards were placed along its extent, about sixteen miles. From the railroad near the Willey House to the top of Mt. Willey, the old path, about three miles long, was cleared of bushes, and four guide-boards were put up. The path from near the Twin Mountain House to the summit of the North Twin Mountain, a distance of about nine miles, was also repaired to passable condition by Mr. Hunt, using nine A. M. C. guide-boards.

Early in August Mr. William M. Sargent, of Plymouth, N. H., was employed, at an expense of $19, to clear a portion of the old path from Waterville toward Livermore, and to cut a new path from it to the present terminus of the railroad for lumbering which runs from Livermore to the Swift River.

The distance from Waterville to the railroad is about six miles. Several A. M. C. guide-boards were erected, where the way might be mistaken because of intersecting wood-roads of the lumbermen.

On the top of Mt. Adams Mr. William G. Nowell in August marked trails with white paint to enable parties overtaken by storm or fog to reach the Madison Spring Hut for refuge; and the Club has contributed $6 to defray partially his expenditure in this work.

Mr. Charles E. Lowe in June had a paint trail marked over the northern part of the Presidential Range to the divide between Mts. Jefferson and Clay, and it was then his intention to complete it to Mt. Washington. While these trails are excellent in summer fogs, they are obscured in autumn by any slight fall of snow. Therefore I would join with Professor Allen in advising that small cairns, or landmarks built up of a few stones, be placed in a series sufficiently near together for guidance along the bald range from Mt. Washington to the Madison Spring Hut and the path leading thence to the Ravine House.

Mr. Eugene B. Cook has cleared the path on the wooded top of Randolph Mountain between its southern and northern peaks, so that visitors may easily find and enjoy the two different outlooks.

The only important new work by this department during the year is the opening of a road and path from near the northwest corner of Tamworth to the top of Mt. Passaconaway. This has been done chiefly through the efforts of Professor Fay on the part of the Club, ably seconded by the enterprise of the farmers of Birch Intervale, Tamworth. The expenditure incurred by the Club was $25. A former logging-road that had become overgrown with bushes was cleared, and serves as the approach to the steep mountain slope, which is ascended by the path. The length of the cutting is about two miles. A lodge, measuring about nine by fourteen feet, with height of seven feet at front and three and a half feet at back, was built of logs, at an elevation of about 3,500 feet above the sea, on a southern shoulder of the mountain and about a third of a mile from its top. Clearings have been made on the wooded summit, giving views of nearly the whole horizon. A better prospect would be obtained, however, from an observatory which might be built of logs at small expense. In consideration of the cordial welcome to Appalachians and interest in the mountain scenery shown by the people of Birch Intervale, I recommend that our Club should aid them in providing such an observatory.

Report of the Excursion Committee for 1891.

The excursions and outings of the Club have been as follows: Eight regular excursions, thirty-two afternoon outings, four field-study section outings, four all-day outings, and four snow-shoe section outings, — fifty-two in all. The Committee have arranged for either an excursion or an outing for every Saturday except six during the year.

On April 2, a party of one hundred and seven made the first excursion of the year to the Blue Hill Range, leaving Boston for Readville, thence taking barges to the foot of Blue Hill, and walking the entire range to West Quincy. The largest excursion was on April 18, when one hundred and seventy joined in a search for Mayflowers at Marshfield. On May 9, seventy-six made a trip to Holt's Hill, in Andover, Mass. On May 30, one hundred members and friends took a train *via* the Massachusetts Central Railroad for Jefferson Station, thence by stages to the Mountain House on Mt. Wachusett. Of this number, thirty-one were accommodated at the Summit House. The party returned to Boston on Monday, June 1. C. H. Hardwick and H. N. Shepard acted as Committee. On June 17, a laurel trip was planned to Milford, N. H., the party (forty-six) going by train. Carriages were provided at Milford, and a drive was taken to Amherst. Laurel was found in great abundance. W. R. Davis and J. R. Carret were the special committee.

The Field Meeting was held at the Laurel House, Catskill Mountains, July 1 to 10, inclusive. A special train conveyed one hundred and nine members and friends *via* the New York and New England Railroad to connect with the Norwich line of steamers for New York. The party took the day line of steamers up the Hudson to Rhinebeck, the ferry to Rondout, thence went by rail to the Laurel House Station, arriving at 6 p. m. on July 2. July 3, the Kaaterskill Falls and vicinity were visited by sixty-nine; fifty-three rode and walked to the Mountain House and Kaaterskill Hotel. July 4, thirty-five walked down Kaaterskill ravine and up Haines' Falls ravine, twenty-seven rode to Haines' Falls, twelve rode to Sleepy Hollow, twenty-one to Tannersville, and thirty-three walked in the afternoon to Sunset Rock. On July 6, thirty-three took the train for Haines' Corners, and then walked to High Peak; eighteen rode to the Mountain House, and twenty to Haines' Falls. On July 7, eighty-six took mountain wagons for an all-day drive to Overlook Mountain and return (32 miles). Dinner was taken at the Overlook Mountain House. On July 8, Mt. Hunter (4,020 feet) was ascended, the party (seventeen) going by train to Hunter station, taking a guide, and then walking up the mountain and descending by the cliffs to Stony Clove; twenty-five accompanied the walking party, and returned to the hotel for dinner; eighteen rode to Palenville. On July 9, twenty rode to Sleepy Hollow, fourteen to Palenville, thirty-two walked or drove to North Mountain. On July 10, at 7 A. M., the party left by special train for Phœnecia. Taking here another special train with dining-car, supplied by the New York and New England Railroad, they arrived in Boston at 6.58 P. M., without change of cars. W. R. Davis, C. H. Hardwick, Irving Elting, and H. C. Francis composed the committee for this meeting.

On August 1, a camping party of forty-six started *via* the Boston and Maine Railroad for the Kineo House, MOOSEHEAD LAKE. Spending Sunday at the hotel, on Monday morning twenty-four of the number went into camp for one week. A steamer conveyed the party each day to the various points of interest about the lake. C. H. Hardwick was the committee in charge.

The Labor Day excursion was to NEWFOUND LAKE, N. H , September 4 to 10, inclusive. The party (thirty-four) were accommodated at the Bear Mountain Inn, Bridgewater. Excursions were made to Cardigan and Plymouth Mountains and Bristol Peak. G. L. Chandler and J. R. Carret acted as committee.

The Autumn Excursion started on October 9, for TAMWORTH, N. H. (Wiggin's Hotel), with fifty-nine in the company. On October 10 a camping-party of eighteen ascended Mt. Passaconaway. A new path had been cut by the farmers of Birch Intervale, and a Club camp built under the direction of Professor Fay. The night was spent very comfortably in the camp by the light and warmth of a large camp-fire. Five guides attended to the wants of the party. Five members of the Club returned by way of Mt. Whiteface, in a rain-storm. Mt. Chocorua was the main feature of the excursion, four separate parties making the ascent, — forty-six in all. Excursions were made to Chocorua Lake, the Madison Bowlder, Ossipee Mountain Park, and Mt. Israel. W. R. Davis was in charge of the excursion.

The Field-Study Section outings were as follows: June 13, to Dedham, with Mr. J. E. Alden; September 19, to Ipswich Sand Dunes, with Dr.

Crozier; November 7, to Newtonville Sand Plains, with Professor W. M. Davis; and November 21, to visit places of historical interest in Salem with Mr. G. M. Jones.

The All-Day Outings were, on June 27, to West Gloucester; on July 25, to Gloucester; on November 3 (Election Day), to Rocky Woods, Medfield; and on December 26, to Lynn Woods and Breakheart Hill, from Saugus Station.

The Snow-Shoe Section had an outing, on January 1, to Medford; January 27, to Newton; March 6, to Newtonville, taking tea at the house of the treasurer of the Club at Newton.

At the Annual Meeting an excursion to Waterville, N. H., was arranged. This took place in February. Nine of the party left Boston for Greeley's on the 16th, three on the 17th, and nine on the 19th, — twenty-one in all. Mts. Osceola and Tecumseh and the Tripyramid Slides were ascended. Two of the party returned to Boston *via* Sandwich Dome, camping over night. The main party returned February 24.

Members and friends to the number of two thousand two hundred and thirty-seven have participated in the various excursions and outings; and one lady has attended forty-two of the trips.

ISAAC Y. CHUBBUCK,
C. H. HARDWICK,
GEO. L. CHANDLER,
W. R. DAVIS,
JAMES R. CARRET,
Excursion Committee for 1891.

Proceedings of the Club.

July 1-10, 1891. — Forty-sixth Field Meeting.

Held at the Laurel House, Catskill Mountains, New York.

A meeting was held in the parlor of the Laurel House, Tuesday, July 7, at 8.30 P. M. President Curtis in the chair. Eighty-five persons were present.

Miss M. E. Hardwick read from Irving's "Sketch Book" the first part of Rip Van Winkle's journey into the Catskills.

Dr. Thomas Crozier gave an interesting talk on that part of the Maine coast bounded by the Kennebec and the Damariscotta rivers.

Mr. A. J. Pratt, a guest of the Club, sang two songs; and then Mr. W. R. Davis read a portion of a paper by W. F. Ganong on "Alpine Botany," given originally before the Massachusetts Horticultural Society.

Mr. F. M. Weis read a selection narrating an adventure in ascending High Peak from the Plaaterkill Clove.

Upon motion of Mr. W. S. Rumrill, a vote of thanks was given to Mr. W. R. Davis and the other members of the Excursion Committee that had the Field Meeting in charge.

After singing by Miss S. W. Ames, the meeting adjourned at 9.40 P. M.

October 7, 1891. — One Hundred and Twenty-second Corporate Meeting.

President Curtis in the chair.

Ninety-five persons were present. Fifteen candidates for Corporate membership were elected.

In re-opening the meetings for the season, the President welcomed the Club back to its work in the city, and also called attention to the Botanical Exhibition to be held in November.

Mr. C. H. Ames gave an account of a trip to "The Organ Mountains, N. M.," starting from Las Cruces. (See p. 289.)

"The Moosehead Camp" was described by Mr. G. M. Jones, who told of the ascent of Kineo and of many delightful excursions by the Club camping-party in August.

Professor C. E. Fay spoke on "Mt. Passaconaway," the goal of a Club excursion planned for October 9. He told of several ascents, of the path and camp built by the Club this summer, and of the fine views. (See p. 302.)

Mr. W. H. Ladd spoke of the Village Improvement Society of Birch Intervale, Tamworth, N. H., and solicited books for its library.

November 11, 1891. — One Hundred and Twenty-third Corporate Meeting.

President Curtis in the chair.

Sixty-five persons were present. Seventeen candidates for Corporate membership were elected.

Mr. Warren Upham presented his report as Councillor of Improvements, describing repairs upon paths, and the construction of path and camp at Mt. Passaconaway. Remarks were made in favor of using cairns rather than paint in marking paths above timber-line. (See p. 347.)

Mr. Charles Eliot presented his report as Councillor of Topography, mentioning the map of Monadnock published in the spring; that of the country about Worcester, soon to be issued; and one locating the mountains and large hills of New England, now under way. (See p. 339.)

Remarks were made by Mr. W. H. Ladd and Hon. Mellen Chamberlain concerning the Birch Intervale library, and the desirability of the Club's helping the farmers to a higher appreciation of Nature, and especially of mountain scenery.

Mr. J. B. Harrison addressed the Club concerning "Open Spaces for Public Resort." He dwelt upon the movement toward buying up the sea-shore by private individuals, and upon the necessity of securing for the benefit of the people desirable reservations along the shore and throughout the State.

December 8, 1891. — One Hundred and Twenty-fourth Corporate Meeting (Evening).

President Curtis in the chair.

About two hundred persons were present. Nine candidates for Corporate membership were elected.

The President announced the appointment of the following committees: on Nomination of Officers, — Charles E. Fay, James R. Carret, W. H. Ladd, Miss M. A. Knowles, and Miss H. F. Kimball; on Annual Reception, — F. W. Freeborn, Byron Groce, Gardner M. Jones, H. E. H. Clifford, Mrs. J. H. Thorndike, Miss M. A. Webster, Miss Dora Williams, and Miss Kate C. Ireson; for Auditors, — C. H. French and C. H. Hardwick.

The President also called attention to the Botanic Exhibition at the Club Room, December 9–19.

"Bandai-san, Miomote, and Matsushima," was the subject for the evening. Two papers descriptive of a trip to these places in Northern Japan were presented by Rosewell B. Lawrence and Percival Lowell. Mr. Lawrence especially described Bandai-san, the mountain which exploded July 15, 1888; Mr. Lowell dwelt upon Miomote and the interesting customs, some of them feudal, of the primitive people of the region. The two papers were prepared independently, and were illustrated by lantern-slides from the writers' negatives.

January 13, 1892. — One Hundred and Twenty-fifth (Annual) Corporate Meeting.

President Curtis in the chair.

Seventy persons were present. Emil Huber, William T. Harris, and J. C. Russell were elected Corresponding members. Eight candidates for Corporate membership were elected.

It was voted to ratify the action of the Council in appropriating to the Permanent Fund all interest accumulated on said Fund to the time of the last payment of interest on the investment.

The Council recommended that a Guest Ticket be provided, to read as follows: —

GUEST TICKET.

....

is entitled to the hospitality of the Appalachian Mountain Club for the year.........

The holder of this ticket is invited to attend the meetings of the Club, to use the Club-room and library, and to avail himself of such special advantages for travelling as may be offered to members.

[Signed] ...., *President.*

It was voted that the plan be adopted and the details referred to the Council.

The Councillor of Natural History presented her report, referring to the meteorological work in the White Mountains, and the Botanic Exhibition held in December. (See p. 338.)

The report of the Excursion Committee in detail was presented by the chairman. (See p. 350.)

The annual reports of the Recording and Corresponding Secretaries, Treasurer, Trustees, and Auditors were presented and accepted. (See pp. 326 ff.)

It was announced that the annual Reception would take place Friday, February 12, at the Hotel Vendome.

Professor C. E. Fay, chairman of the Committee on the Nomination of Officers for 1892, reported as follows: President, Byron Groce; Vice-President, Albert S. Parsons; Recording Secretary, Rosewell B. Lawrence; Corresponding Secretary, Frank W. Freeborn; Treasurer, John E. Alden; Councillors: Natural History, Warren Upham; Topography, Charles Eliot; Art, Elizabeth H. Denio; Exploration, Arthur L. Goodrich; Improvements, Richard B. Grover; Trustee of the Permanent Fund for three years, Rest F. Curtis.

The balloting for officers resulted in the election of those nominated.

On retiring from the chair, the President, Mr. Rest F. Curtis, made a few remarks, and then introduced the President-elect, Mr. Byron Groce, who assumed the chair.

A paper entitled "Camping in the Highest Sierras," by Mr. Hubert Dyer, of San Francisco, was read by Mr. F. W. Freeborn. The paper was full of interesting incidents, and included an ascent of Mt. Whitney. (See p. 273.)

Officers for 1892.

President.

Byron Groce, 4 Schuyler Street, Roxbury.

Vice-President.

Albert S. Parsons, Lexington.

Recording Secretary.

Rosewell B. Lawrence, 23 Court Street, Room 409, Boston.

Corresponding Secretary.

Frank W. Freeborn, 9 Park Street, Room 17, Boston.

Treasurer.

John E. Alden, 18 Post Office Square, Boston.

Councillors.

Natural History, Warren Upham, 21 Newbury Street, Somerville.
Topography, Charles Eliot, 50 State Street, Boston.
Art, Elizabeth H. Denio, Wellesley College, Wellesley.
Exploration, Arthur L. Goodrich, 6 Linden Street, Salem.
Improvements, Richard B. Grover, Roslindale.

Trustees of the Permanent Fund.

William H. Niles. Isaac Y. Chubbuck.
Rest F. Curtis.

Members added since July, 1891.

CORRESPONDING MEMBERS.

Harris, William T., Washington, D. C.
Huber, Emil, Zurich, Switzerland.
Russell, I. C., Washington, D. C.

CORPORATE MEMBERS.

ALDEN,[1] JOHN T., Newton.
AMEN, HARLAN P., Poughkeepsie, N. Y.
Bailey, Mrs. A. R., Newton.
Barber, J. W., Newton.
Barry, Mrs. John F., New York City.
Boyden, Ernest N., Boston.
Bradbury, Woodman, Laconia, N. H.
Breed, Mrs. Caroline A., Lynn.
CLEVELAND, MRS. C. M., Allston.
Cordley, Frank R., Roxbury.
CUTLER, CHARLES N., Chelsea.
Davis, Miss Lillie J., Melrose.
Farwell, Edward S., Dorchester.
Field, Miss Amy W., Dorchester.
Flint, Charles L., Boston.
Free, Albert T., Boston.
Gale, Thomas K., Syracuse, N. Y.
Greene, Miss Caroline S., Boston.
Joyce, Miss Adeline T., Brookline.
Judkins, Miss Harriet W., Winchester.
Macomber, Miss Sarah N., Roxbury.
Macomber, Walter L., Boston.
Mason, Mrs. A. F., Brookline.
Mason, James H., Boston.
Merrill, George E., Newton Centre.
MOXOM, PHILIP S., Boston.
Nolte, George H., Boston.
Plummer, Miss Mary A., Melrose Highlands.
Porter, Mrs. Rachel S., Hyde Park.
Pratt, Albert J., Boston.
Preston, William G., Boston.
Read, Miss Abbie L., Salem.
Rich, William P., Boston.
Sawyer, Mrs. J. H., Chestnut Hill.
Shultis, Mark, Medford.
Shultis, Mrs. Mark, Medford.
Sleeper, Miss Katherine, Tamworth. N. H.
Smith, F. Warren, Dorchester.
Thallon, Miss Florence N., Brooklyn, N. Y.
Thompson, Marshall P., Lawrence.
Tuttle, Miss Grace A., Salem.
Wainwright, Robert, Cambridge.
Weeks, Mrs. A. P., Chelsea.
Wildman, Miss Gertrude, Newton.
Wildman, Miss Linda F., Newton.

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[1] The names of Life Members are printed in small capitals.

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